



# THE SURGICAL CLINICS OF NORTH AMERICA

OCTOBER 1929  
*VOLUME 9—NUMBER 5*  
PHILADELPHIA NUMBER

PUBLISHED BI-MONTHLY  
**W B SAUNDERS COMPANY**  
PHILADELPHIA AND LONDON

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PUBLISHED BY W. B. SAUNDERS COMPANY, PHILADELPHIA, PA. PRICE PER YEAR, \$ 5.00

ENTERED SECOND-CLASS FEB. 28, 1907. POST OFFICE PHILADELPHIA, PA.  
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# THE SURGICAL CLINICS OF NORTH AMERICA

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Volume 9

Number 5

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CLINICS OF DR. JOHN B. DIWICK AND DR. VERNER  
G. BURDEN

LANCERNAL CLINIC ST. JOSEPH'S HOSPITAL AND PHILADELPHIA  
CENTRAL HOSPITAL

## CLINICAL REPORTS

### RELATIONSHIP OF THE PYLORIC SPHINCTER TO PEPTIC ULCER

It is a remarkable fact that the treatment of peptic ulcer has attained its present efficiency through methods which are essentially empirical. Therapeutic progress and results have far exceeded the advance made in etiologic studies—a state of affairs that is not unusual in surgery. There is ample evidence to support the conclusion that some peptic ulcer heal spontaneously, that others are cured by medical measures, and that the results of proper surgical treatment are among the best obtainable by any surgical procedure.

We are accustomed to look upon a surgical lesion as the cause of disturbed function which we endeavor to restore to normal by removing the offending lesion. Operations primarily designed for the correction of abnormal functions have not always been kindly received. Yet the dominant control which pathologic changes maintain over the craft of surgery must soon recognize the primary etiologic importance of derangement of function. Progress in the understanding of peptic ulcer has been retarded by a thin shell of formal dogma teaching a willingness to be satisfied with good-enough results by the ligaturing and fixation of the stomach without attention to the various states of medical



and surgical therapy and by false attempts to treat the symptom rather than the disease.

The treatment of peptic ulcer exclusively by medical means is uncertain and hazardous. Direct inspection affords the only certainty of the existence and the state of an ulcer. The accidents of hemorrhage and perforation cannot be foreseen or prevented.

While the results of surgical treatment have been a lesser benefit to many patients, the surgical failures have received undue publicity. Postoperative results are easily determined but the morbidity and mortality of medical treatment remain unknown and we have no desire to compute them.

Numerous theories have been exploited in the search for the cause of peptic ulcer but until recently little has been done to disturb the status of a gastro-enterotomy in the treatment of this condition. Peptic ulcer now enjoys earlier recognition and earlier treatment than formerly but gastro-enterotomy when done in the early stage has not been attended by the satisfactory results which followed it due to older lesions complicated by pyloric obstruction. It also seems that the immediate good results of gastro-enterotomy are not always maintained as the postoperative period lengthens.

While the symptom of peptic ulcer is highly pathognomonic every experienced surgeon has counted many instances where the clinical history, laboratory tests and x-ray report have clearly indicated an ulcer which did not materialize when the stomach and duodenum were carefully inspected by sight and touch. Typical symptoms in the absence of ulcer are not uncommon. The mimicry of ulcer by disease of the appendix or of the gall bladder suggests that the hypersecretion and tubercle of gastric function is not dependent on ulceration and that this functional derangement may actually precede and later cause the appearance of ulcer. While peptic ulcer is characteristically chronic there are a surprising number of ulcerations which heal spontaneously. It does not seem therefore that the cause of chronicity lies in the ulcer itself. Furthermore, many instances where it seems to be an inherent tendency of the ulcer

to recur after excision after gastro-enterostomy and even after resection of the stomach. These recurrences can no longer be ascribed to faulty technic. We attempt to condone our ignorance by speaking of patients with an ulcer diathesis.

From the above facts it would seem that we have good reason to regard peptic ulcer as a sequel of persistent dysfunction of the stomach. This theory is further supported by Mann's experiments with surgical duodenal drainage and by Morton's production of jejunal and gastrojejunal ulcers. It cannot be denied that hydrochloric acid is an important factor in the causation of ulcer. How the normal secretion of the stomach may become a harmful agent can be partially explained by the surgical physiology of the stomach.

The main secretory products of the stomach are pepsin and hydrochloric acid which attain their identity only after leaving the gastric gland. Newly formed hydrochloric acid has a concentration of about 0.5 per cent. Since this concentration of acid is injurious to living cells and inhibitory to gastric digestion it is normally reduced to an optimal strength of 0.2 per cent. This reduction is accomplished by ingestion of food and liquid by the secretion of the stomach of other diluents especially during the intergastric phase of digestion by the possible ability of the stomach to regulate its own acidity but mainly by the established fact of regurgitation of alkaline duodenal secretion back through the pylorus and into the stomach. In the regulation of gastric acidity the pyloric sphincter plays a double role in its control of duodenal regurgitation and the outflow of gastric contents. Normally the function of the sphincter is nicely co-ordinated with the activity of the stomach through nervous control. When this co-ordination is disturbed it is manifested clinically by pylorospasm or achalasia. The disturbance is usually temporary and may be seen following an infection in life as the result of mental stress and strain and frequently after operation especially when the peritoneum has been opened. Intrapertitoneal disease such as appendicitis, cholecystitis and pelvic disorders, particularly distending to the pyloric sphincter and exerts a more prolonged effect

Clinical studies have shown that in certain individuals the pyloric sphincter is unusually irritable and may exhibit inco-ordination such as pylorospasm or achalasia over long periods of time. Patients with peptic ulcer usually have pylorospasm or achalasia and as Morton has shown in these cases there is free hydrochloric acid in the first portion of the duodenum where under normal conditions it is never found while Alvarez has demonstrated hypertrophy of the pyloric sphincter in case of gastric ulcer but not in duodenal ulcer.

Although the normal activity of the pyloric sphincter is in accord with gastric function and disturbance of its mechanism may cause partial retention of the contents of the stomach. This is exemplified in marked degree by infantile pyloric stenosis. Lesser grades of retention as the result of achalasia and pylorospasm occur in peptic ulcer. Actual obstruction with reversed peristalsis and mucus only ensues when there is cicatricial contraction of the pylorus. Compensatory hyperperistalsis is usually sufficient to overcome the resistance of the pyloric sphincter which exists in case of ulcer so that emptying of the stomach although delayed is eventually completed. While pylorospasm and achalasia cannot withstand the push of gastric peristalsis they act as a marked hindrance to the weaker force of duodenal regurgitation. Abnormal function or inco-ordination of the pyloric sphincter must hold an important place in our understanding of the cause, symptoms, and treatment of peptic ulcer and is the explanation of the partial retention. The results of pyloric dysfunction are partial retention with minor gastric hyperperistalsis distending the duodenum with the pylorus hyperchlorhydric from irritation with local regurgitation and the ejection of the duodenal chyme into the gastric content. There is no doubt that peptic ulcers form where the abnormal state persists and that peptic ulcers occur when the body meets conditions unusual either of their own accord or as the result of mechanical interference.

Gastroenterostomy has heretofore been the most usual

treatment for peptic ulcer. By making a new stoma in the stomach the ill effects of pyloric obstruction are largely obviated and gastric retention and hyperacidity are controlled by freer drainage and regurgitation through the stoma. But the anastomosis may fail to accomplish these essential when the current in the proximal loop sweeps past the stoma without entering the stomach and a marginal or jejunal ulcer or reactivation of the old ulcer may occur. The formidable nature of the lesions which mark the failure of gastroenterostomy has been the chief objection to the operation. More radical measures such as resection of the stomach have not only added little to the results of gastroenterostomy but carry a higher mortality and a smaller percentage of failures.

Simplicity and conservation rather than increasingly radical and deforming operation should be the objective in the surgical management of ulcer. This is especially true in view of the fact that some ulcers heal spontaneously and that nearly all uncomplicated ulcers have a tendency to heal during remission of symptoms only to become reactivated when the pyloric antrum recurs.

On the basis of the theory which we have advocated in previous communication that peptic ulcer is a sequel of dysfunction of the pyloric sphincter we have in the last two years carried out an operation designed partially or completely to abolish the function of the sphincter. On this we thought it might appear that simple resection of the sphincter after the method of Rammstedt or by the pyloroplasty of Heineke-Mikulicz would suffice to abolish the sphincter permanently. But in our experience and in that of others such procedure accomplishes only temporary interruption of function until the interruption of continuity of the lining of the sphincter after which it carries on its function as before. Complete denervation of the sphincter cannot abolish its action because the intestinal musculature can contract and relax independently of nerve attachment. Removal of the anterior half of the pyloric sphincter after the method described in a previous paper and herein illustrated must insure complete abolition of

pyloric function. The operation is carried out simply and quickly without extensive exposure or dissection. Its perform-

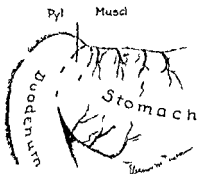


Fig. 368—R m al f port f pyl m scl St p 1 L f ex

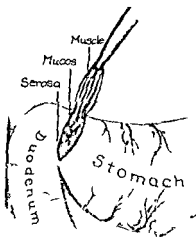


Fig. 369—R m l f po f pyl m scl S p 2 R m l f m scl

ance consumes less than half the time of gastroenterostomy, there is little chance of technical error and the finished operation does not disturb the normal anatomical relationships of the parts involved.

We have performed this operation with gratifying results in chronic duodenal and gastric ulcer in acute perforated duodenal ulcer in gastrojejunal ulcer and in combination with circular resection of the stomach for ulcer. We have also removed

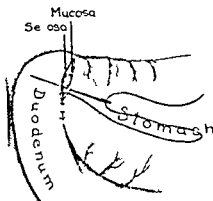


Fig 30—R 1 f p o t f p y l m s c l S t p 3 C l f s e s a

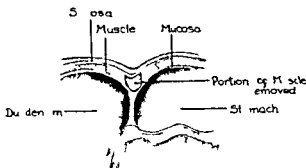


Fig 31—S e t h g l u h d d o d m l g p o r t f p l m s c l r e s e l

the anterior half of the pyloric sphincter for pylorospasm associated with hernia of the gall bladder and appendix. The results up to the present time have been very satisfactory. The patients experience immediate relief of symptoms, and while postoperative gastric analyses have not shown absence of free hydrochloric







F t l t t m l t t h t m h d

	1	2	3	4	5	6	7	8
F ee HCl	75—	88—	92—	80—	54—	0—	55—	68
T t l d ty	90—	100—	108—	9—	103—	94—	60—	79

F st g t t 2 l c f HCl 28 t t l d y 40

### BLEEDING GASTRIC ULCER

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 f m d l l h i h d l t l d d l m h h l t d f t ty f  
 h H t l l ry r d occa l l y h d l m The p  
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 We ght 136 po d T l t 99 F p l e 108 p 28  
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T t l d ty	40—	13—	45—	60—	58—

F t g tent 11 c. f HCl 16 t l ad ty 28

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# HERNIA THROUGH THE FORAMEN OF WINSLOW

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Hernia through the foramen of Win low is a very rare con-  
 dition and when found is usually associated with some con-  
 genital anomaly of the intestinal tract such as faulty rotation of  
 the viscera or the presence of a common mesentery for the  
 entire intestinal tract The foramen of Win low is usually small  
 and is often occluded by adhesions which act to preclude the  
 formation of a hernia through it Reduction of a hernia through

F ct 1t t meal t th t m h d

		1	2	3	4	5	6	8
F	HCl	5	85	9	80	54	0	55-68
T	tal di y	90	100	108	95	103	94	60-9

F st g t t 2½ c. fee HCl 28 t t f cid y 40

### BLEEDING GASTRIC ULCER

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T	tal acid y	40	43	45	60	58	68	5-5

F sting co t 11 c.c. fee HCl 16 t al cid ty 28

Fl oscop xam tion f th m h l d od m w g t ve  
cept for postor t d f m ty Th t d pe t l f th t m h  
good Th l tract

### HERNIA THROUGH THE FORAMEN OF WINSLOW

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t r y l Th pa s e d s e t y l m l c o t t l  
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h r t l y f t m l p e o d f s e r a l y Th s e t t k w t  
m p d l y s e t  
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l o d m A b o u t 2 f e t f t h m l l t t b o t h t s s e l  
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Hernia through the foramen of Winslow is a very rare condition and when found is usually associated with some congenital anomaly of the intestinal tract such as faulty rotation of the viscera or the presence of a common mesentery for the entire intestinal tract. The foramen of Winslow is usually small and is often occluded by a lichen which act to preclude the formation of a hernia through it. Reduction of a hernia through

the foramen is often attended by supreme difficulty because of the danger incident to injuring the neck of the hernia which has within its immediate vicinity such important structures as the portal vein the hepatic artery the common bile duct the inferior vena cava and the first portion of the duodenum. Usually

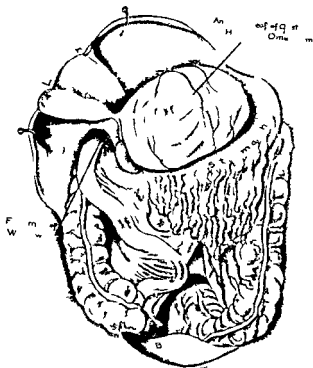


Fig. 32—Hernia of the small intestine.

only procedure which can be safely performed is to make an incision in the neck of the hernia and allow the herniated portion of the intestine to remain in the lesser peritoneal cavity. Needless to say, the mortality in the reported operation is high.

## RIGHT PARADUODENAL HERNIA

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This case is an instance of right paraduodenal hernia. The condition is infrequent and has usually been discovered only at autopsy. In 1913 Nagel reported 28 cases collected from the literature to which he added one from the Mayo Clinic. In 17 of the reported cases operation had been performed with only two patients surviving. The remaining cases were discovered at autopsy or in the dissecting room. According to Movnhan

this foramen is often attended by supreme difficulty because of the danger incident to injuring the neck of the hernia which has within its immediate vicinity such important structures as the portal vein, the hepatic artery, the common bile duct, the inferior vena cava and the first portion of the duodenum. Usually

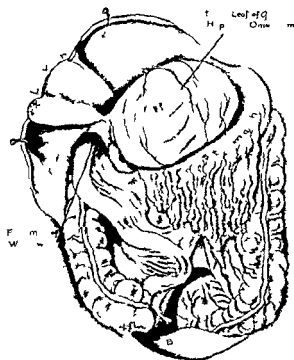


Fig. 372—Hernia of the diaphragm (W.)

the only procedure which can be safely carried out is the reduction of a jejunojejunostomy and allowing the herniated portion of the intestine to remain in the lesser peritoneal cavity.

Needless to say the mortality in this type of hernia is high.





right paraduodenal hernia originates in a fossa in the mesentery of the upper part of the mesojejunum which was first discovered by Waldeyer and is sometimes spoken of as the mesenterico-parietal fossa. The condition is rarely diagnosed during life and is usually an accidental finding. In the histories of the cases reported the symptom described may be classed as digestive troubles, chronic intestinal obstruction and acute intestinal obstruction. The only feature in the physical examination which might be suggestive of a paraduodenal hernia is the finding of a palpable definite resonant mass. However the examiner rarely has this condition in mind and consequently the diagnosis during life or before operation has never been made so far as we have been able to determine.

### HEMATOMIA OF RECTUS MUSCLE

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 case wa interesting from the stan lpoint of lfferential diagnosis  
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 have been due to a localize l inflammation or to an epigastric  
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### SUPPURATIVE THYROIDITIS

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**Discussion**—The thyroid gland is only rarely affected by acute or chronic inflammation. Cases of thyroiditis have been reported following or during the course of scarlet fever and typhoid fever. Cases of this kind usually subside without active treatment and are rarely followed by untoward result. Pre-existing lesions in the gland such as adenomata and cysts seem to be predisposing factors, cases being reported in which active inflammatory changes and abscess formation have been superimposed upon these lesions. Thyroiditis sometime follows an attack of sore throat or acute laryngitis. The relationship of trauma to the etiology of thyroiditis is not definite but appears to have been a factor in the above reported case. The inflammatory change in the thyroid gland may extend to all portions of the gland or may remain well localized to an adenomatous cystic area.

The microscopic picture shows the usual changes accompanying inflammation such as infiltration by polymorphonuclear cells and small round cells. There is usually thrombosis of the smaller vessels which is probably due to the fact that there is little collateral circulation between the vessels in the gland itself.

The symptoms of thyroiditis include fever, local tenderness, swelling of the gland, but an accompanying laryngitis and

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frequently dysphagia. Pain is often a prominent symptom because of the intracapsular tension. The gland may be stony hard and suggest malignancy but may be differentiated from the latter by the history. The basal metabolic rate is usually elevated during the active condition apparently from stimulation of the function of the gland and the elevated temperature. In the later stages following the onset of extensive fibrosis in the chronic cases the function of the gland is often subnormal probably due to destruction of glandular tissue. This hypofunctional state of the gland when persistent may give rise to myxedema. It is probably true that when myxedema follows resection of the thyroid it is due not to the removal of too much tissue but rather to inflammation and fibrosis of the remaining portion of the gland.

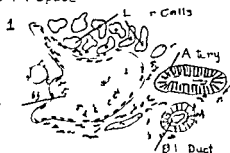
### CHOLANGITIS

Cholangitis is a clinical and pathologic entity representing a diffuse infection of the biliary tract in which the bile channels are characteristically involved. The seriousness of this condition is dependent upon the extent of the infection, the consequent derangement of liver function and the harmful and often permanent sequelae.

A knowledge of the minute anatomy of the bile duct is necessary for a complete comprehension of the pathology of cholangitis (Fig. 373). The bile ducts are not merely passive channels for the transport of bile although this is their chief purpose. A close study of their structure reveals that they are lined by a modified type of columnar epithelium and that arranged along the wall of their lumen are numerous tiny acinar openings. Emptying into these parietal accules are the glands which are most extensively in the wall of the principal duct. These glands produce a mucous secretion which is collected in the parietal accules and later poured out into the duct. It will take little trouble to make the histologic study of the bile duct from a case of cholecystitis in which the infection is grossly confined to the gall bladder. He will frequently find the parietal gland of the duct evidence of inflammation.

such a round cell infiltration edema and cystic changes in the gland. It will be apparent that these changes often accompany cholecystitis and that more extensive involvement of the parietal gland of the duct within and without the liver constitutes the chief pathologic feature of cholangitis. The infection in cholangitis is not confined to the surface of the lumen of the ducts but

### FIGURE 1 Space



### Bile Duct [ 1 9 ]

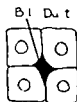
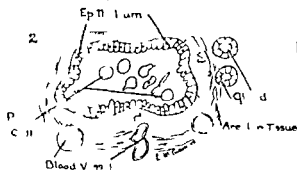


FIGURE 1 Space

in the intramural space in the wall which accounts for the testicular and difficult therapeutic management of the lesion.

Cholangitis is usually accompanied by extension of the infection to contiguous structure. The most frequent association is with cholecystitis and it is often difficult to ascertain



whether the infection in the gall bladder is the primary focus or a secondary lesion. From experimental work and clinical studies it has been determined that cholecystitis may arise independently of infection in the liver. This can be accounted for by a selective localization of bacteria or according to the doctrine of a prepared soil as the result of a primary functional derangement of the gall bladder or by a combination of the two. It is not difficult to conceive that many cases of cholecystitis begin as a

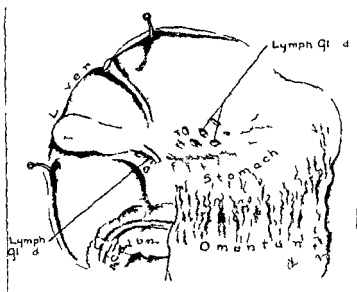


Fig. 374.—Etiology of lymph gland enlargement.

diffuse infection of the biliary tract and when the acute inflammation subsides the residual infection becomes localized in the gall bladder where certain factors favor its chronicity.

When operating for cholecystitis the surgeon frequently finds changes in the regional lymphatics such as enlargement of the nodes in the hilus of the liver at the junction of the intrahepatic common ducts along the course of the common duct, the margin of the gastrohepatic omentum and especially the head of the pancreas (Fig. 374-375). These nodes are often markedly

swollen and may actually cause obstruction to bile flow by pressure on the ducts. The finer lymphatic channels in the liver especially those radiating from the region of the gall bladder are often distinctly seen. The condition actually constitutes a lymphangitis. The head of the pancreas is frequently swollen and soft while the body and tail are not involved. The changes within the liver may cause the organ to be enlarged and congested. Sections of the liver will show inflammatory changes around the smaller bile-ducts and degenerative lesions—

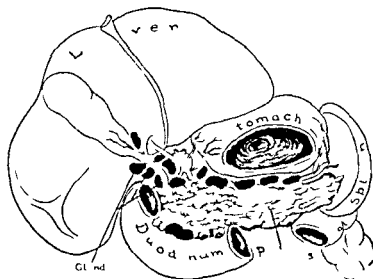


Fig. 375—Fig. 1 gall lymphoid liver dis.

cellular and cloudy swelling of the parenchymal cells. The intra-hepatic lesions are usually confined to the right lobe but in more severe cases the left lobe and even the spleen may also be involved in the infectious process.

Cholangitis is sometimes encountered in the course of the infectious fevers such as influenza pneumonia typhoid fever and acute rheumatic fever. In such instances the symptoms pointing to involvement of the biliary tract are light jaundice with pain tenderness and sometime enlargement of the liver.

whether the infection in the gall bladder is the primary focus or a secondary lesion. From experimental work and clinical studies it has been determined that cholecystitis may arise independently of infection in the liver. This can be accounted for by a selective localization of bacteria or according to the doctrine of a prepared soil as the result of a primary functional derangement of the gall bladder or by a combination of the two. It is not difficult to conceive that many cases of cholecystitis begin as a

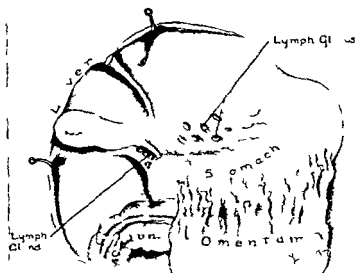


FIG. 34.—Enlarged lymph glands in gallbladder and omentum.

diffuse infection of the biliary tract and when the acute condition subsides the residual infection becomes localized in the gall bladder where certain factors favor its chronicity.

When operating for cholangitis the surgeon frequently finds changes in the regional lymphatics: such as enlargement of the nodes in the hilus of the liver at the junction of the cyst and common duct along the course of the common duct in the margin of the gastrohepatic omentum and venae cavae with the head of the pancreas (FIG. 34, 35). These nodes are often marked

swollen and may actually cause obstruction to bile flow by pressure on the ducts. The finer lymphatic channels in the liver especially those radiating from the region of the gall bladder are often distinctly seen. The condition actually constitutes a lymphangitis. The head of the pancreas is frequently swollen and soft while the body and tail are not involved. The changes within the liver may cause this organ to be enlarged and congested. Section of the liver will show inflammatory changes around the smaller bile-ducts and degenerative lesions—

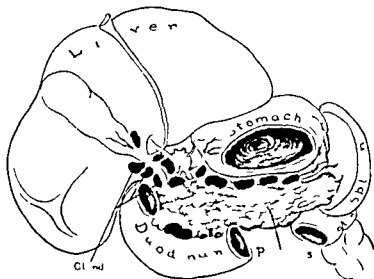


Fig. 375—Illustration of the abdominal cavity showing the liver, stomach, and duodenum.

edema and cloudy swelling of the parenchymal cells. The intracellular inclusions are usually confined to the right lobe but in more severe cases the left lobe and even the spleen may also be involved in the infectious process.

Cholangitis is sometimes encountered in the course of the infectious fever such as influenza pneumonia typhoid fever and acute rheumatic fever. In such instances the symptoms pointing to involvement of the biliary tract are slight jaundice with pruritic lesions and sometime enlargement of the liver.

This type of cholangitis may be either toxic or infectious in origin the jaundice is due to functional deficiency of the liver. There is also a primary type of cholangitis infectious in origin which begins with fever often septic in type malaise gastrointestinal disturbance and jaundice. This condition is sometimes confused with acute catarrhal jaundice acute yellow atrophy of the liver and with chronic pancreatitis. In cholangitis the infectious features predominate and the jaundice is only moderate in degree. Most of these cases subside in the course of several weeks and may completely clear up. It is not unusual however for the condition to recur. When the symptoms do not subside in due time or become aggravated there is urgent indication for surgical consideration and it is usually necessary to provide for external biliary drainage.

Cases of cholangitis are also encountered where the early history is one of gastroenteritis. In these the likelihood of an ascending infection either by way of the lumen of the common duct or along the neighboring lymphatics must be considered.

However surgical experience shows that in the majority of cases of cholangitis there has been some pre-existing lesion of the biliary tract with a recent characteristic exacerbation of infection or interference to the flow of bile. A preliminary attack the most common associated lesion is cholecystitis a local complication such as stone in the gall bladder and within the common duct. Stone in the common duct is usually associated with cholelithiasis and as we have previously shown this is a local complication. Acute exacerbation is due to infection in the duct either by the extension of infection from the gall bladder or by a partial or complete obstruction to bile flow. The infection may then rapidly involve the entire biliary tract and the patient is in a septic state with intermittent chill and fever persisting until such time as the infection has subsided or until the patient dies. The infection which may partially fade only to become deepened by further obstruction and creas. If intervention is too long delayed the infection goes on to the formation of pus within the duct with distention of the gall bladder and of multiple large or small abscesses in the liver itself. The gravity of the situation becomes greater as the surgeon's help is withheld until the infection has become

of the liver has been destroyed beyond hope of redemption by any means whatsoever. Stricture of the common duct may closely simulate calculus obstruction because the symptoms of both with the exception of pain are essentially those of cholangitis. A stricture may cause only partial obstruction to the bile flow but with insidious progressive and often symptomless harmful effects on the liver as the result of back pressure. This condition is analogous to the renal damage due to urethral stricture and to chronic prostatic obstruction. Acute obstruction to bile flow occurs when there is reactivation of the infection about the stricture with edema and occlusion of the lumen. In this case of the common duct this means the onset of cholangitis.

For clinical purpose it is convenient to divide cholangitis into two chief types, acute and chronic. The former is represented by acute catarrhal and acute suppurative forms while the chronic variety closely resembles hepatitis and biliary cirrhosis and is characterized by recurrent acute attacks of fever, light jaundice and painful swelling of the liver. A type of cholangitis which particularly concerns the surgeon is that which occurs after operation on the biliary tract. Occasionally after cholecystectomy the patient will have light jaundice and fever for four or five days. During this time there may be anxiety on the part of the surgeon as to the possibility of injury to the ducts or an overlooked lesion. Fortunately in most instances his anxiety is relieved by complete disappearance of the symptoms. This type of postoperative reaction is not alarming when it occurs after operations for acute lesions because the operative trauma is likely to result in some temporary reactivation or extension of the already existing infection but its occurrence after operation for chronic lesions may be more disturbing and more difficult to explain. In these instances there may be a light degree of cholangitis sufficient to interfere with the function of the liver and to cause jaundice. It is also possible that the trauma incident to the operation especially in view of the close proximity of important nerve centers may be a factor in causing a transient disturbance of liver function. The removal of the biliary tract especially about the gallbladder and duct has

This type of cholangitis may be either toxic or infectious in origin the jaundice is due to functional deficiency of the liver. There is also a primary type of cholangitis infectious in origin which begins with fever often septic in type malaise gastro-intestinal disturbance and jaundice. This condition is sometimes confused with acute catarrhal jaundice acute yellow atrophy of the liver and with chronic pancreatitis. In cholangitis the infectious feature predominates and the jaundice is only moderate in degree. Most of these cases subside in the course of several weeks and may completely clear up. It is not unusual however for the condition to recur. When the symptoms do not subside in due time or become aggravated there is urgent indication for surgical consideration and it is usually necessary to provide for a permanent biliary drainage.

Cases of cholangitis are also seen where the early history is one of gastro-enteritis. In these the likelihood of an ascending infection either by way of the lumen of the common duct or along the neighboring lymphatics must be considered.

However surgical experience shows that in the majority of cases of cholangitis there has been some pre-existing lesion of the biliary tract with a recent acute exacerbation of infection or interference to the flow of bile. As previously stated the most common associated lesion is cholecystitis and its complication such as stone in the gall bladder and in the common duct. Stone in the common duct is usually associated with a choledochitis and as we have previously shown this infection is deeply interstitial. Acute exacerbation and extension of this smoldering infection in the duct ensue when the already prolonged partial or complete obstruction to bile flow. The infection may then rapidly involve the entire biliary tract or may give rise to a septic state with the intermittent chills and fever persistent jaundice which may partially fade only to become deeper as the obstruction increases. If intervention is too long delayed the condition goes on to the formation of pus within the duct within the gall bladder and of multiple large or small abscesses within the liver itself. The gravity of the situation becomes proportionally greater as the surgeon helps withheld until the vital function

If the liver has been deprived beyond hope of redemption by any means whatsoever. Stricture of the common duct may closely simulate calculi of obstruction because the symptoms of both with the exception of pain are essentially those of cholangitis. A stricture may cause only partial obstruction to the bile flow but with in a long progressive and often symptomatic harmful effects on the liver as the result of back pressure. This condition is analogous to the renal damage due to urethral stricture and to chronic prostatic obstruction. Acute obstruction to bile flow occurs when there is reactivation of the infectious agent at the stricture with edema and occlusion of the lumen. In the case of the common duct this means the onset of cholangitis.

For clinical purposes it is convenient to divide cholangitis into two chief types: acute and chronic. The former represents essentially acute catarrhal and acute suppurative forms while the chronic variety closely resembles hepatitis and biliary cirrhosis and is characterized by recurrent acute attacks of fever, slight jaundice and painful swelling of the liver. A type of cholangitis which particularly concerns the surgeon is that which occurs after operation on the biliary tract. Occasionally after cholecystectomy the patient will have slight jaundice and fever for successive days. During this time there may be anxiety on the part of the surgeon as to the possibility of injury to the ducts or an overlooked stone. Fortunately in most instances his anxiety is relieved by complete disappearance of the symptom. This type of postoperative reaction is not alarming when it occurs after operations for acute lesions because the operative trauma is likely to result in some temporary reactivation or extension of the already existing infection. But its occurrence after operation for chronic lesions may be more troubling and more difficult to explain. In these instances there may be a slight fever of cholangitis sufficient to interfere with the function of the liver and cause jaundice. It is also possible that the trauma incident to the operation especially in view of the close proximity of the vagus nerve center may be a factor in causing a transient disturbance of liver function. The region of the biliary tract especially about the gall bladder and duct has



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the treatment for both being essentially the same distinction between the two is of little practical importance In cholangitis there are recurrent attacks of fever jaundice enlargement of the liver which on direct inspection presents a mottled appearance and rounded edges (Fig 376) In biliary cirrhosis the liver

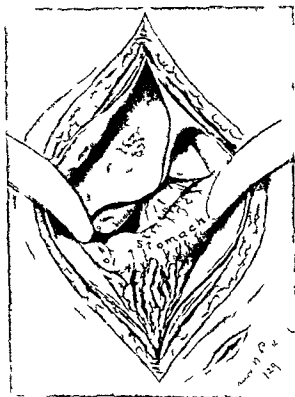


Fig 376—L th m tti d f e

is likewise enlarged but has a grayish or blue appearance and frequently presents radiating lines the result of deposits of fibrous tissues (Fig 377)

While the most frequent type of postoperative cholangitis runs a self limited course and is not serious there sometimes occurs a fulminating type in which symptoms are those of

important reflex nervous connections which can be demonstrated under general anesthesia by making traction on the gall bladder when it will be frequently found that respiration is temporarily interrupted. It is therefore important to reduce the necessary operative manipulations to a minimum. Thorough exposure of the parts by ample incision, the proper placing of gauze and gentle traction will go far to accomplish this purpose. The danger of cholangitis is one of the chief reasons for postponing operation in acute lesion of the biliary tract until the patient is free of fever and until the infection has been well localized and the peritoneum protected by the formation of adhesion and the interposition of omentum around the infected area.

The symptoms of cholangitis are those of infection plus certain peculiar features related to the liver and its functions. In mild cases there is fever, malaise and anorexia, slight jaundice and often an appreciable enlargement of the liver. The symptoms may persist for several weeks and the condition subside spontaneously. An accurate diagnosis may be difficult because of confusion with catarrhal jaundice, stone in the common duct, hepatitis and pancreatitis. Laboratory tests are helpful to a certain extent but should not be implicitly relied upon. The van den Bergh test will serve to differentiate obstructive from functional jaundice. Estimation of the amount of serum bilirubin permits a daily observation on the degree of jaundice so that the surgeon is able to know more or less accurately the progress of this phase of the condition. However, with the aid of or in spite of favorable laboratory reports the surgeon must exercise his own ripe judgment based on experience and on his estimate of the patient's condition as to the exact time for and the extent of the procedure to be adopted. In the severe type of cholangitis characterized by persistent deep jaundice and extreme prostration the outlook is grave and while some form of drainage operation is urgently indicated the surgeon must exercise extreme caution as to the proper time for intervention and his efforts should be confined only to the necessary minimum.

Chronic cholangitis closely resembles biliary cirrhosis.

consideration an early surgical opinion should be sought and the case preferably should be directly under the surgeon's care. Any form of temporizing or medical treatment without surgical guidance is usually hazardous. This applies particularly to the primary type of cholangitis. The early surgical treatment of lesions of the biliary tract should be more widely adopted especially since present day diagnostic methods such as cholecystography, blood chemical studies, the van den Bergh test and liver functional tests have increased the percentage of early diagnoses. An early appeal for the surgeon's help that is early in the course of the disease will do much to lower the mortality of disease of the biliary tract to curtail morbidity figures and to reduce the menace of such complications and sequelæ as cholangitis, chronic pancreatitis and biliary cirrhosis. The actual surgical management of cholangitis requires careful and mature judgment. Drainage is the chief objective of any procedure that may be adopted. The manner in which this is to be attained must be determined by the conditions found at operation. The best immediate interests of the patient are of first importance rather than ambitious surgical procedures. When the condition is acute external drainage of bile should be provided for by the most direct means. At times this may be most easily accomplished by cholecystostomy. When there is any doubt as to the efficiency of this method it should be supplemented by drainage of the common duct. For this purpose it is our practice to use a T tube. By the use of this method of drainage it is possible to maintain an external escape for the bile over as long a period as is needed. In a number of instances we have allowed the tube to remain in place for several years with beneficial result. The use of the T tube serves several purposes: it provides for the external drainage of bile with the escape of infection; it reduces the intrahepatic and intrahepatic tension; and it also permits the flow of some bile down the common duct and into the duodenum. Removal of the T tube is accomplished by traction and without injurious effects. We very seldom use internal biliary drainage by cholecystogastrostomy or cholecystoduodenostomy for the following reason: external biliary

extreme infection with quite marked hepatic insufficiency, deep jaundice and myocardial degeneration. These cases usually terminate fatally.

Cholangitis because of the mild initial symptoms is occasionally mistaken for catarrhal jaundice. Careful daily observa-

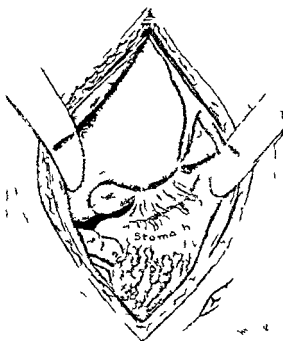


Fig. 3.—L. h. d. h. k. i.

tion however should establish the diagnosis in the patient is sick there is fever but the jaundice is not so marked as in catarrhal jaundice the patient is more comfortable than sick.

The most important factor in the treatment of this is its surgical management. Re-a-die of the appropriate

# GENERAL SURGICAL CLINIC OF DR W WAYNE BABCOCK

SAMARITAN HOSPITAL AND TEMPLE UNIVERSITY

## OPERATIVE DECOMPRESSION OF AORTIC ANEURYSM BY CAROTID JUGULAR ANASTOMOSIS

C I (R f d by D J seph B W lft) —M X B J w h g  
f ty fi y ma d  
Ch f C mpl t—P co d l p dy pep p l t t m t  
dy p d g t ca d p l p t t ca l d f  
kl no t lght gh w th th km l p t t  
P t Ill —F y g pa b g ght l w bd m l  
q d t wh h d t g t d th b k w t d w th dy p p  
lt t l d by lkal by t t fg b t by f p g t  
Th w lght p d l d m f t A d g f g l l b l d d d se  
m d d pp ght bd m l pe t pe f m d 1926 l  
1927 h pla ty d Ed ma f b th l g d kl d p ffi  
l t th f p pea d Th p t t b g t t ly d l ped ma k d  
p l p t t d dy p rt th bb g head h t d  
lght gh h fly p se t t ght wh mbe t d mp d by  
th pe t t f th km pl g A g t h p t d  
th p t t f m w k g f th l t ght m th  
P ev H l y -P t t h d th l h l d hood d se l d g  
m l h p g gh sca l t f d phth d h k g f  
(h ) M se b g t t l y g la p g y w th m l  
d l ry t th g f t ty h l d l g d w l l m pa se ght  
m th g  
Phy al E m at —A f ly w l l d l p d w ma h g p ffi  
bo t th f d dd h b l h b t th y P p l q al th  
l f d l t d w th bse t lght fl Right p p l f mal d t  
l gg hly t lght T th poo d t t gu c t d t l hy  
pe t ph l P l t f b th ca t d l Th p l at f th b  
l t q l Th h t ma k d ly l g d h fly t th  
l ft th pe be t d f se d p l p b l th th t p 7½ m f m  
ll Th pe g t f m m gu g t t m m hea d  
th t t m t t d t th l f th k th b l g d  
th seco d t p t th ght d l f t f th t m Exam t f  
th l g g t Abd m fl bly l d w th ca f t p  
pe t b l m l t p l p a b l t m h d ced k j ks  
d l som h t scl t l q l th p l se f th t h mm type

drainage is preferable in cases of infection the stoma of an anastomosis does not long remain patent when the common duct is not obstructed and the presence of an anastomotic opening may actually favor the ascent of infection from the stomach or duodenum into the gall bladder and the upper biliary tract.

In conclusion we may emphasize the following important points: the resistant nature of the infection in cholangitis is explained by the minute anatomy of the bile-ducts; the seriousness of the condition is dependent on the extent of the infection and the derangement of liver function. The important factor in the proper management of this type of infection is the provision for biliary drainage. A certain percentage of cases are mild in type and recover spontaneously but these cannot be differentiated with certainty unless the patient is under daily observation and preferably in the care of an experienced surgeon.

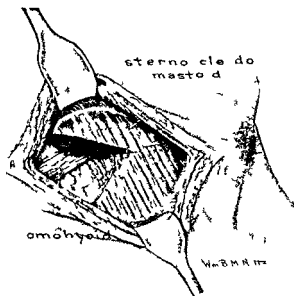


Fig 380—C d j gul t m f f t p t lly  
d ll p t lly mpl t l d d th t l l t l

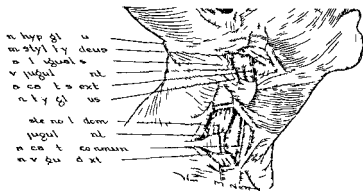


Fig 381—C t l j gul h g th t m l l t hp  
f th mm t l rt ry t l j gul d g



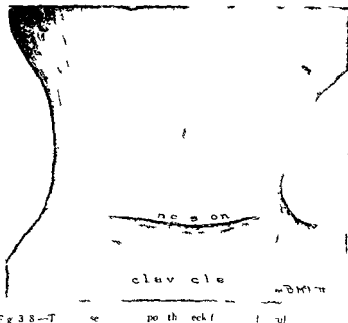


Fig 38--T

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Fig 39 C

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Blo d p —J 10 1929 ght 185/10 1 ft 195/10

Lab t y E m t —U g t blood W se ma g t

CO l m pe t 6

El t d g ph—M k d l ft t ! p po d ce C w

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ma k d hgt h l p lsat



Fig 384—C t d j g l t m T t l th cult  
th t y d d gth t m d lso t t th m t  
f b k p th t f f t d bo t th sel so to  
t rupt l t Th rt y d l g t d bo by l k d d d  
bel th l g t d d d by th gud t d t d t m  
f th p mal d m d th fi t l l k Th t p th n  
m d d th d pe l y f th d ca f lly l d th t d  
g by fi b l k l k O co t f th t t p d d t co  
d d d l l t se catgut th ghbo hood f l t  
mos

R l g g m—Fl cop xam t h sa cul ry m f  
th h f t l t

Cl l S mm y—P lsat f d l d ca t d g t right

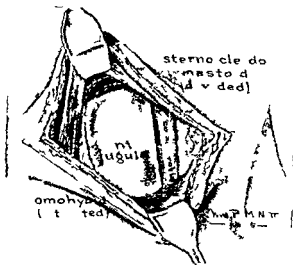


Fig 3 —Ca t d j gul m Tb car t d heath b bee pe d  
vpo gth m l j gula in

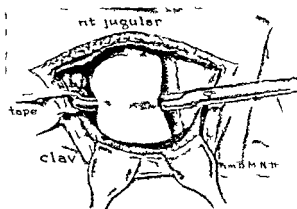


Fig 383 —C t d j gula an m s. Th ag d d c  
hypogloss nves h e bee ca f l d pla ed d rro tape g  
ge tl carr ed bo h m l j gul

Bl d-p —J 10 1929 ght 185/10 l ft 19 /10  
 Lab t y E m i —U g t blood W se m gat e  
 CO l m pe t 6  
 El t oc d g ph—M k d l ft v t cul p po d C w v  
 p d d w d l pe lght d f mp m t f co d t t m  
 ma k d hgt h l p lsat

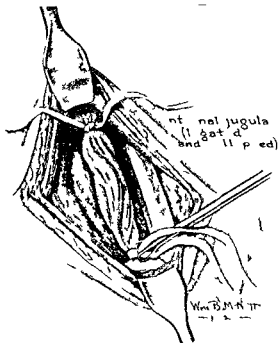


Fig 344—C t d j g l t m T t l th l t  
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 f b k p th t pe f t d b t th l so t  
 t rupt l t Th rtry d lgt d bo by lk d d d  
 bel wth lgt d d d l yth gud t d t d t m  
 f th p nal d m d wth fi t l lk Th t p th  
 m d d th d pe l y f th d ca f lly l sed th t d  
 g by fi bl k lk O t f th t t p d d t co  
 d d d bl t catgut th ghbo hood f l to-  
 mos

R lg g m—J l cop xam t h sa cul ry m f  
 th l f th rt  
 Cl l S mm y—P lsat f d l d ca t d g t ght

d th l ft h t m k dly l g d t th l ft ma k d d g t  
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 f t type w th so d my ca l l l sc se d ff rt g  
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 A th by local fil t l l pe ce t p oca d l sol  
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## Aneurism

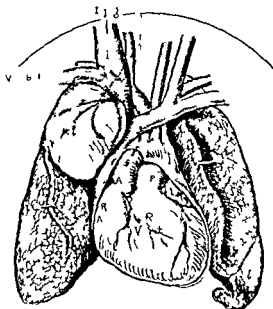
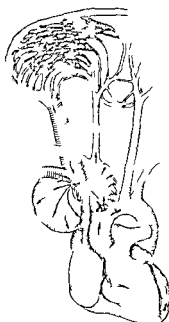


Fig. 385.—Ill st t g th b k p po th m f  
 rj m f h sc d gpa t f th h f h

C l d j g l E d to-e d l t m sn Right—Se  
 2 bo'e th ght l l C mm ca d d i j  
 d bly l gated d lly by bl k lk C cul l l l r  
 pe l g t Art ry d d d bo t ½ cm bo'e h l f  
 curv Art ry lgh ly th mat E d o- d i i  
 bl k rt l lk d th ee fi t y Af h f  
 lberat d h d d t g p l g f  
 m ted th t f h t ry h h bo h d h f i

Th t m lyth d f g! — b t th th ck f t  
 p p d th gh th th w ll th ru h g t l t t ld ly be  
 see A m ll fl ak ag d t cutt g f ll kn tw e ly co t l d  
 A m k d l cut f ll d th pe t A d ce f h k eact  
 f m th t m D g th pe t p t f ll t 18 d th  
 pul d pped f m 148 t 10 p b bly d t cot m  
 I t p t ly t f l pt f ly deep t m  
 f ll ll se f m t g P lse 110 l g pe t g m d



I g 380 — A y f h t l g l g t call th l  
 t tl kull f m th t d d t l l t d th t  
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 100 f ty h f pe t A l kht h k g co gh t d ty h  
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 g l t m 138/10 l ft m 124/10 J 22 1929 ght m 154 0 l ft  
 140/0 Pl m CO l m pe ce t 60 El t oca d g ph h d  
 se ght l l l m  
 l ry f d mp m t l j t y pt m ma k d  
 l t e l ght l f k E pe ll k g th l f f mtl  
 g Aft be g al d f th l t ghtee m th h pat t  
 h bee bl t m h h se k

Comment—Four years ago in September 1925 I first attempted to decompress a thoracic aneurysm by an end-to-end anastomosis between the common carotid artery and the internal jugular vein. Following the operation the large aneurysmal sac which had perforated the ribs became reduced in size the pain largely disappeared and the man is still living clinically much



Fig. 38.—Illustration of the thoracic aneurysm, showing the aneurysmal sac, the heart, and the major blood vessels. The aneurysm is shown in cross-section, revealing its internal structure. The heart is positioned centrally, with the lungs on either side. The major blood vessels, including the aorta and pulmonary arteries, are clearly visible.

improved over his preoperative condition. The operation has now been attempted by various operators over 13 times with accumulating evidence of its value to reduce the pressure within the aneurysmal sac to relieve pain and to prolong life in case of large aneurysm of the arch of the aorta. Cerebral aneurysm

plication due to ischemia from the operation is apparently rare and it is probable that simultaneous ligation of the jugular vein prevents the harmful cerebral anemia and hemiplegia which in about 25 per cent of cases follow the simple ligation of the common carotid artery. Should a sufficient degree of decompression not be obtained by the first operation we have con

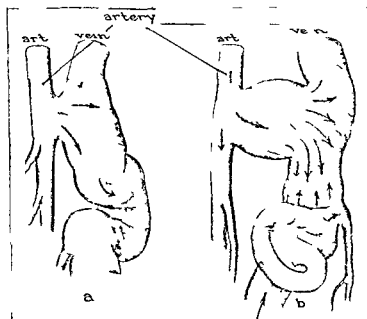


Fig 388—III t t g th d sa t ff t po th cul t  
 ( mtl l t l t m f r y d Th gre tly d l t  
 d tl l t mp d d d F d t d  
 t l t l t d th h t th f t t f q l cal t t  
 tl t f th loc t d l t d th l t f l t t d  
 l gm t d

sidered the possible desirability of a double anastomosis using in the secondary operation upon the opposite side of the neck a subclavian union. Thus far this has not been required and excluding cases in which there is a technical defect in the anastomosis it would seem to be a remote necessity. As an alterna



**Comment**—Four years ago in September 1975 I first attempted to decompress a thoracic aneurysm by an end to end anastomosis between the common carotid artery and the internal jugular vein. Following the operation the large aneurysmal sac which had perforated the ribs became reduced in size the pain largely disappeared and the man is still living clinically much



Fig. 387—Illustration of the thoracic aneurysm. The aneurysm is shown as a large, rounded mass on the left side of the thorax, adjacent to the heart and major vessels. The illustration shows the heart, lungs, and the surrounding structures, including the trachea and major blood vessels. The aneurysm is depicted as a large, rounded mass, likely representing the aneurysmal sac mentioned in the text.

improved over his preoperative condition. The patient has now been attempted by various operators over 13 times with accumulating evidence of its value to reduce the pressure within the aneurysmal sac to relieve pain and to prolong life in a case of large aneurysm of the arch of the aorta. Campbell

segment of artery was tried in this case to avoid the extra stress at the curve but is not advised. The thick walled artery is rigid and difficult to bend into a curve whereas the thin walled vein seems to be entirely competent to withstand the extra arterial pressure around the curve after an end to end union. There was no evidence of undue stress from the presence of the arterial blood stream. The vein not only did not dilate but showed by its reduced size that the wall pressure was less. Likewise very fine arterial silk has proved to be amply strong for the anastomosis and I have encountered no special difficulty from leakage along the line of anastomosis.

The observations emphasize the hydrodynamic law that pressure upon the wall of a tube containing a moving liquid progressively decrease as the velocity of the liquid is increased. Emphasis should again be made however upon the fact that a lateral or side to side anastomosis between an artery and vein may do great harm. The effect is quite different from that of an end to end union which is the only type to be considered as a therapeutic measure (Fig. 388).

tive method an anastomosis between the subclavian artery and vein also has been considered as being possibly preferable in certain cases although technically more difficult than the carotid jugular union. For an aneurysm of the abdominal aorta a decompressive operation of the same type by dividing the



Fig. 389.—Patient with aneurysm of the thoracic aorta. The patient is shown in profile, facing right. The neck area is visible, showing the trachea and the junction of the carotid vessels.

iliac artery and join with an end-to-end anastomosis of the proximal end is technically entirely feasible. We have been impressed by the sufficiency of the external and apparently single jugular vein in withstanding the torrent of arterial blood that rushes into it after the anastomosis. The use of a lower

# CAROTID JUGULAR ANASTOMOSIS IN THE TREATMENT OF ADVANCED PULMONARY TUBERCULOSIS

C IL (R f d by D J seph Ulm d D R h d J Ben t)—  
 Wh t mal g t ty ght yea  
 P t Ill —B g h l bed th b k k l J 19 8  
 th p th h t w l h t d ft t t k Nght  
 t d pl y d l p d th co gh w th p f se p t t  
 d l f 30 p d w ht F th p t f w k p t th h d  
 ru g d tly so th t  
 F m ly H t y—F th d d f thm m th f q y  
 P er H lory—H dg h t y g l h l m d t ly  
 m k occa lly d d g dd t N h t r v f th d  
 Phy l E m t —P t t f ly ll d l p d d n h d  
 l q tly b d h d fcy m j d h  
 pe t t p d t h k g gh f h ry lightly j t d Left  
 p rui t d h g w th t t d th m t d Th ll  
 d l p d ymm t cal w th t ca p po t t l d cal  
 f m t sed th gh t b th l g P Upp h lf f th  
 ght d t l ft l g h w m k l mp m t A l t t B th  
 d ght l g p l g d d h mph q l ty t th pe  
 Sl f kl g al h d th h p t a d p t ft  
 gh B th d mph l ft l g b l w th l l d lightly  
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 b th ppe l t Bl d M y 21 19 9 R d blood ll 4 700 000 l k  
 yt 11 050 polym pl lea l k yt 90 pe ce t  
 P t t sel t d th h f ll co se t f t l f th w pe t  
 l g h pel ly d ced type f b l t l p lm ry t be l  
 Op t 5/21/29—N l cal th 8-cm t se  
 t fi ge b dtl b th m d l h lf f th ght l l t l d  
 t d p t lly d d d t l j gul f d t be m d t l  
 d l t d t m l ca t d y f g ght t l j g l d  
 m ca t d r t ry d d d d t l d l g t d p mal d t  
 mos d d to- d by fi t l lk l kag l g t l Th  
 t g rt l cu t kd be se tl gh th th t l ce d  
 p od ced ma k d palp bl bru t W d l d l y th t l g



# CAROTID JUGULAR ANASTOMOSIS IN THE TREATMENT OF ADVANCED PULMONARY TUBERCULOSIS

C e II (R f d by D J seph Ulm d D R h d J B t) —  
 Wh t ! g tw ty ght y  
 P t Ill —B g wh l b l th b k kl J 1928  
 th p th h t wh h t d ft t t w k Nght  
 t a d pl y d l ped th co h th p f pect t  
 d l f 30 p d w ght F th p t f k p t th t d  
 g d ce tly so th t  
 F m ly II t y—F th d d f thma m th f q y  
 P ex II t y—H dg rrrh t y g l h l m d t ly  
 m k ca lly d d g dd t N h t ry f th s d  
 se  
 Ph y l E m t —P t t f ly w ll d l p d d h d  
 l q tly b d h w d fcy m j d h  
 pe t t p d ct h k g gh Ph ry lghtly j t d L ft ea  
 p l t d h g with t t d th ma t d Th w ll  
 d l ped ymm t cal with t ca p po t t l d v cal  
 f m t s sed th gh t b th l g P Uppe h lf f th  
 ght d t l ft l g h m k d mpa m t A lt t B th  
 so d ght l g p l g d d h mph q l ty t th pe  
 Sh fcr kl g al h d thea h p t d p t ft  
 gh B th d mph l ft l g b l with l l d lghtly  
 p l g d lse h a y fi d m d m kl g al h d E  
 t m t g t pt f lght l bb g f th fi g Bl d p  
 120/60 U ry xam t g t W se m g t bl d  
 h m try h g 74 mg 14 g Sp t m 4/29/29 M y  
 t b l b ll p f ld 5/1/29 M y t be l b ll p f ld  
 R t g g m Ap l 30 19 9—Ch lce t p lm ry t be cu  
 l l g t l ft l g d ppe po t f ght th ca t t  
 b tl lpe l b Bl d M y l 1929 R d blood ll 4 00 000 l k  
 yt 11 050 polym ph lea l k cyt 90 pe t  
 P t t sel t d with h f ll co se t f t l f th pe t  
 l g h pel ly d ced type f b l t l p lm ry t be cul  
 Op t 5/21/29—N l cal th 8-cm t  
 t f g b dth bo th m d l h lf f th ght cl l t l d  
 t d pa t lly d d d t l j gul f d t be m d t ly  
 d l t d lea t d t y f ght t l j g la d  
 m ca t l rt y d d d d t l d l g t d p mal d t  
 mosed d t d by fi t l lk leakag l g t l Th  
 t g t l cu t ld be se th gh th th t l ce t d  
 p d ced ma k d palpabl bru t W d l ed la tl t d g



# CAROTID JUGULAR ANASTOMOSIS IN THE TREATMENT OF ADVANCED PULMONARY TUBERCULOSIS

C IL (R f d by D J seph Ulm d D R h d J B t) —  
 Wh t l g t ty ght yea  
 P t Ill —B g h l be l w th b k k l J 1928  
 th p th h t wh h t d ft t t k N ght  
 t d pl y d l ped th w co gh w th p f se p ct t  
 d l f 30 p d w ght Γ th p t f k p t th f d  
 g ea d ce tly so th t  
 F m ly H to y—F th d d f thma m th f q y  
 P ex H t y—H dg h t y g l h l m d t ly  
 m k ca lly d d g dd t N h t ry f th d  
 se  
 Ph y I E m t —P t t f ly w l l d l p d d h d  
 l q tly b d h d f cy m j d ha  
 pe t t p d ct h k g gh Ph ry l ghtl j t d L ft  
 p r ul t d h g w th t t d th m t d Th w l l  
 d l ped ymm t cal w th t ca p po t t l d v cal  
 f m t cr sed th gh t b th l g P on Uppe h l f f th  
 ght d t l ft l g h m k d mpa m t A l t t B th  
 so d ght l g p l g d dh mph q l ty t th pe  
 Sh f kl g al h d th h p t d p t ft  
 gh B th d mph l ft l g b l w th l l d l ghtly  
 p l g d l se h ma y fi d m d m kl g al h d E  
 t m t g t p t f l ght l bb g f th f g Bl d p  
 120/60 U y xam t g t W se m g t t l d  
 h m trv h g 74 mg 14 mg Sp t m 4/29/29 M y  
 t be l b l l p f l d 5/1/29 M y t be l b l l p f l d  
 R t g g m Ap l 30 19 9—Ch l t p l m ry t be cu  
 l l g t l ft l g d ppe port f ght w th ca t t  
 b th f pe l b Bl d M y 21 1929 R d blood l l 4 700 000 l k  
 yt l l 050 polym pl lea l k cyt 90 pe t  
 P t t sel t d th h f l l co se t f t l f th pe t  
 h g h pel ly d r a ced type f b l t l p l m ry t be cul  
 Op t 5/21/29—\ local th 8-cm t se  
 t f g b dth bo th m d l h l f f th ght l l t l d  
 t f d part lly d d d t l j gul f d t be m d t l  
 d l t d t l ca t d r t y f g ght t l j g la d  
 mm ca t d r t ry d d d d t l d l g t d p mal d t  
 sed d to d by f t l l k leakag l g t l Th  
 t ong r t l cu t l d b se th gh th th t l ce t d  
 p od d ma k d palpabl b t W d l sed l w th t d g



5/2 / 9 Co gh d bly lght pa t t f t m  
 5/23/ 9 T mperat t bo 99.6 F  
 5/25/ 9 C gh red ced d t mpo ry se of m ll d f od  
 lly sy co l sc  
 5/30/29 All t m d—primary —s g bru t l  
 right k

	Before operation	On dyspnea four days after operation	Four weeks after operation
T mpe t	98.2 100.6	99.0 99.6	98.4 98.8
P lse	60-100 0	80 0-112 0	80 0-106 0
R p t	40 36 0	20 0 30 0	20 0 24 0

Cond t D k g —Imp ed ma ked th ll palpabl t f  
 na t m d f tly d bl t pat t—co gh d pect t ma k dly  
 l se d—s l; t se se f mp d health— ce b l compl t

**Comment**—Tuberculosis is a disease in the active stages of which it has been found desirable to reduce the expended energy of the body as much as possible. Rest is the keynote of the modern treatment of pulmonary tuberculosis. The operations that are now being employed for its relief aim to compress and reduce the function of the affected lung. Artificial pneumothorax, phrenicotomy, thoracoplasty are examples of operations of this type. All reduce the capacity of the lung so that for equal aeration of the blood the patient must breathe more frequently or more deeply. While the compressed portion of the lung may work less the thorax as a whole must labor more to provide a respiratory interchange of gases equal to that existing before the operation was performed. Despite this disadvantage the compression operations have been found very valuable in the treatment of phthisis. But suppose that in the scheme of providing general rest we should also give the lung relief from work beyond that afforded by rest in bed by reducing the required frequency and amplitude of the respiration much as we give the heart rest by reducing the number of its beats. It would seem very desirable to give the lung rest by increasing its essential functional capacity.

A sume that without reducing the oxygen carbon dioxide interchange we reduce the respiration of a bedfast tuberculous patient from 34 to 24 a minute this would mean a saving of 10

inspirations and 10 expirations a minute with the associated energy expended in moving the thorax and diaphragm. In one hour the patient would be saved the work required by 600 respirations in one day 14,400—a very appreciable saving of energy and of movement of the diseased lung. Would not this seem of advantage during the active stage of pulmonary tuberculosis a period during which it is so desirable to relieve the patient of every bit of unnecessary effort? Assume that with this conservation of respiratory energy the circulation through the lung was so increased as to produce a hyperemia about the tubercles a condition long considered very advantageous in the treatment of tuberculosis. Tubercles are essentially avascular and measures to increase the blood supply to the tubercle have been used for many years. Witness for example the use of tuberculin and of Bier's method by artificial hyperemia. If rest hyperemia and increased functional capacity of the lung can be obtained without increased effort on the part of the heart would it not seem that the patient should be in a more favorable condition for the healing of the pulmonary lesion? At least such theory has for several years appealed to me and this patient presents the first clinical test. The patient was selected as having a bilateral hopelessly advanced form of pulmonary tuberculosis and the object of the operation as stated has been to decrease the work and to increase and modify the blood supply of the affected lung. From the fourth to the seventeenth day after operation the respiratory rate has shown an average decrease of 8 per minute or a saving of 480 per hour or 11,520 respirations per day as contrasted with the preoperative rate. The temperature range has been distinctly lower than that before the operation the cough and expectoration have decidedly decreased and the patient thinks that he is much better. We trust that he is not over-optimistic and a one who gladly accepted the risks of the first experimental operation we feel that he deserves to recover and hope that the previous gloomy prognostications of his medical adviser may be in error. It need not be emphasized that the operation is in an experimental stage and much more evidence will be required to establish its value or otherwise.

5/22/29 C gh d bly lght pa t t f t is  
 5/23/29 T mpe t t bo 99.6 F  
 5/25/29 Co gh red ced d t mpo ry se f mall d f cod  
 lly e co lese  
 5/30/29 All t es m d—p mary —s g bru t l  
 right eck

	Before operation	On four days after opera	Five days after operation
T mpe t	98.2 100.6	97.0-99.6	97.4-98.8
P lse	6.0 100.0	90.0-112.0	80.0-106.0
Resp t	24.0 36.0	20.0 30.0	20.0-24.0

C d t D h g —Imp d ma k d th ll p l pabl  
 t mos d f tly d bl t pat t—co gh d pect t ma kedly  
 l—c d—s lject se se f mp l health— reb l mpl ca

Comment—Tuberculosis is a disease in the active stages of which it has been found desirable to reduce the expended energy of the body as much as possible. Rest is the keynote of the modern treatment of pulmonary tuberculosis. The operations that are now being employed for its relief aim to compress and reduce the function of the affected lung. Artificial pneumothorax, phrenicotomy, thoracoplasty are examples of operations of this type. All reduce the capacity of the lung so that for equal a ration of the blood the patient must breathe more frequently or more deeply. While the compressed portion of the lung may work less, the thorax as a whole must labor more to provide a respiratory interchange of gases equal to that existing before the operation was performed. Despite this disadvantage the compression operations have been found very valuable in the treatment of phthisis. But suppose that in the chem of providing general rest we should altogether relieve the lung from work beyond that afforded by rest in bed by reducing the required frequency and amplitude of the respiration much as we give the heart rest by reducing the number of its beats. It would seem very desirable to give the lung rest by increasing its essential functional capacity.

Assume that with out reducing the oxygen carbondioxid interchange we reduce the respirations of a body at rest from 16 to 10 per minute. This would mean a reduction of 40% in the

# PHRENICOTOMY FOR PULMONARY TUBERCULOSIS

C III—M El beth S g tw ty f y h t gl  
 p t ca h dmtt d t th S f D f th Ch t S ma t  
 H p t l d th ca f D L C h d D F H Kruse M h 0  
 1929

Ch f C m pl t—C gh pect t dy p pa th h t d  
 h ld po gh g



Fig 390—R tg g m f C se III l f ph t my f p lm ry  
 t be l

I H t —I D mbe 1926 pat t d l ped co gh  
 pe los f w gh J d gn f p lm ry t be l w  
 m l Sh J ed t F gl ll S t m Decembe 1926 h  
 l mp d l l sch g d ed ca D mbe 19 7

The operation like that for the thoracic aneurysm consisted in bypassing a generous percentage of arterial blood from the aorta back to the right heart to mix with the venous blood entering the lung and by its high velocity accelerate the pulmonary circulation and by its high oxygen content decrease the rate or amplitude of the respiration. The lung therefore continuously receive partially oxygenated blood and never wholly venous blood. There is in part a double oxygenation and from the ensuing reduced CO content in the blood a lessened stimulation of the respiratory center in the medulla is to be expected with a slowing of the respirations. Apparently this has been accomplished.

Tissues do not live upon venous blood. anoxemia is followed by cellular degeneration and death occurring promptly in the cells of the central nervous system slower in those of parenchymatous organs and eventually in the simpler tissues of the body. Note for example the results of a prolonged nitrous oxide anesthesia with insufficient oxygen and the degeneration and the necrosis and ulceration of the leg from venous blood remaining in contact with the tissues where there are incompetent varicose veins. Tissues cannot live on venous blood. Evidence that the great flow of venous blood from the pulmonary arteries is insufficient for the nourishment of the lung is shown by the separate lesser pulmonary circulation which carries arterial blood to the lung. By the operation we have performed upon this patient a large supply of fresh arterial blood also enters the lung through the pulmonary artery producing what may be a new and supplemental source of nourishment. There may be present in the oxygenated blood other and more subtle chemical substances than are yet understood and these may be capable of further modifying the tuberculous process.

The technical method of bypassing the blood from the aorta back to the right heart and lungs precisely that described in the treatment of the thoracic aneurysm. That the volume of arterial blood returned to the lung is not inconsiderable will I think be admitted by anyone who has witnessed the operation.

Sput m g t f t be l th d w th t t f m g t  
 N t b l b ll fo l cul t d gu p g d d d d y  
 U h l d f lb m hy l d fi gr l cast d m  
 l kocy t Blood W se m g t h m gl b 4 50 000 l kocytes  
 15 350 poly l 8 pe t mall l kocy t 40 pe t l g lym  
 ph cyt 2 pe ce t m l 2 p t t t l 2 p t  
 l h l lph phth l t 60 18 p t 200 5 pe t  
 195 30 pe t

T ty f h ft dm t th Sama t H p t l th  
 f l tt mpt mad t p l t fi l p m th by  
 t d g dl th ght f ll ry g th ght m d l l  
 l F ty ght h l t t tt mpt —also f l—w mad  
 th ght d th ght pe t ll ry l t th xth d th  
 l t m l l l t th se d t p f ll d b th pe t  
 t f l l dy p t m

Th p t t w t f d t th g cal serv 3/25/29 w th d g  
 f b l t l p lm ry t b l l pl l dh p t g  
 rt fi l p m th th q t f ph t my Wh l th h  
 p t l th p t t h l l l p d pl t w th ll m ca t l kocy t  
 l blood th

R tg g 3/30/29—L ft l gf ly l ght d ph gm 2 h  
 h l th m l scatt d f co sold t th gh t th ght  
 l g h rt d t ght d f h t pp tly by dh b tw  
 pe ca l m d pl D g P lm y t be l d dh  
 p lly f th glt h t

Op t 4/4/29—T p t 98 F p t 2 blood  
 p 100/78 A th t — co—l cal w th fil t t by l pe t  
 p oca d l (30 ) Op t E ght ph n 6-cm  
 t se 5 m bo th l l t g l t l m g  
 f t m t d l h ry p d cal t d wh  
 p h d ul m t t d l ght h t w th p N ry  
 fil t d w th p ca sol t d d d d tal l l ly w d b t  
 h m t t 15 m be g m d b f th rve pt d P t p t  
 co l t s t f t y V m t g d sea p bably f m tl t  
 t l f f ft h f f th ght h t l m t d P t p  
 t p lm y y pt m d t tly l tt th th sep t b f th

C IV—M M M C h t g th ty y dm tt d 4/2/29 t  
 th Se f D se f th Cl t Sam t H p t l d D L  
 C l d D F H kruse f th p l t f rt fi l p e m th ra  
 P a H t y—I t t gh th k y ll w h expe t t be  
 g g h l l t y g doe t gh t glt b t th gh  
 d pe t t k l th g gft eat U l h id  
 hood d se se M ru l h t ry g t m l t y p g  
 Phy l E m al —I t t f ly ll d el ped d h d

Th p t th ently d d f a t pl t s.

Af m th f rth t h m h t d t k S m h l er  
 f ll g tt k f fl za ll p svmp m t rned d th  
 pat t h be bed f h ee m th h gh pe t t pa  
 th h d creased t mpe t M ru l d g to- r h t ry  
 g  
 Phy al F d g -I t t f l ll h d blood p 12 / 0  
 h d eck, d m th g t cept f l gh l jected l hest



Fig 391—R tg g m f C se III h g f d ph gm  
 f ll ing ul f phre r v ssoc d h ed ced gh d  
 pect t

fl t resp os o- bd m l h p r v lag h gh d  
 Th scd oc l f m t bo h gh d l f p d l l f  
 base Th bse ce f oc l d ct l f mutu ght base h bse  
 b eath so d h pe ed pect l q bo h p es pec ll h gh  
 d t ly m t ll t p ce Abd m l xam

h t C gh l p e t t l s e d h l d b f i t t t  
 p t t d s c h g l l y f t p e t R o e t g o g m—d p h g m  
 l t d b o t 3 m b o h l l p s e t b f p t  
 O J 19 9 p t t w d m t t d t h S g c a l S h g  
 g l g h t l h g b f f m c o g h d p t t h d s  
 h g f m t h h p t l T h w l k y t f 21 000 d p o l y m p h o  
 l t f 80 f m t t k f p p e d t A t l y f l m d

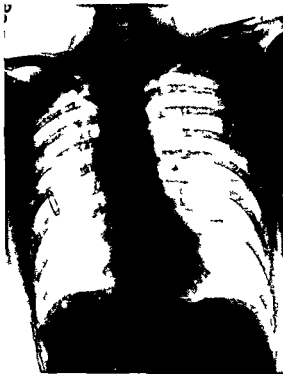


Fig 193—l o e t g g m—C l v—b e f p h t m f p l m r y  
 t l c u l

11 l d l y D J h L d m m g y t t  
 t f h s e t f y p O p e d p l t h e s h  
 d f l T l l r l b l f t t h d  
 h s e t h l s e t f l

**Comment** The diaphragm is supplied by the phrenic nerve derived from the third fourth and fifth cervical nerves sym



Head eg t Ch t ll d l ped p t ry cu q l b th  
 d m t 3l e ppe right l be eased tact l f m t on ght d  
 m t ales e t ght l g pec ll pec l ft l g g t H rt  
 bd m l t mt g t L g t Blood H m gl b  
 5 130 000 l kocy 10 800 polyn lea 2 m ll l kocy l l ge  
 l kocytes 5 t l l W se ma t compl m tary  
 Roe tg z m 4/2/29—T be cul l t p f ght l g h  
 ca ty bo 3 m d m t  
 April 11 1929 d ce f p m h ra f mp t od ce  
 g h d bee mad



F g 39 —Sca f m phre cot m C se IV

Ap 1 11 19 9 tube l fil ra f ppe port f  
 bo h l g h fly gh d heart d gh d l f m d  
 h th pe ca d m  
 S mpt w mad p od ce rt f al p m h b  
 cces f l l f pl l dh  
 P t f d t th S g l S cr h q f ph  
 cot my Ap 1 16 19 9  
 Ope t on 4/23/29—F cm t se l ll f m  
 bo d f m ma d 6 m bo l l ph r d d f d d  
 bo h m t t Th t g p ll f h d ph gm po h d g  
 tract ry d T d h lf m f h m d  
 T mperat re 98 4 F p lse 9 p 22 blood p 1 0  
 P t p t —\ se f t l h cr se p lse mpe  
 t f ra ry h g d ma k d d m t m m f gh

phrenic and accessory phrenic—which usually lies between the first rib and root of the lung—is destroyed. This operation insures a complete paralysis of the corresponding half of the diaphragm. The paralyzed diaphragm then rises in the chest reducing the ipsilateral thoracic cavity from one fourth to one third. The operation increases the effect of a previous artificial pneumothorax or it may be used as in the two cases cited when pneumothorax by reason of pleural adhesions or other cause cannot be accomplished. Both of the patients here presented have apparently been decidedly benefited by the operation. In one patient the cough and expectoration immediately stopped after the diaphragm was paralyzed.

**Technic**—The operation while it must be exact is not as a rule difficult for one familiar with the anatomy of the neck. It need produce little disfigurement and may be done within ten or twenty minutes without the use of a general anesthetic. We prefer to emmenthorax a tuberculous patient by a hypodermic injection of morphin 0.01 gr. scopolamin 0.005 given one hour before the time of operation and repeated after twenty minutes if a sufficient narcosis is not produced. Local anesthesia obtained by infiltrating with a 1 per cent procain epinephrin solution is used immediately before the operation. A transverse incision preferably along a wrinkle line of the neck is made centering over the posterior border of the sternocleidomastoid at the level of the cricoid or the carotid tubercle. The incision according to the amount of fat in the patient's neck and the operator's experience may be from 2 to 8 cm. in length. The incision is placed above the omohyoides where the phrenic nerve lies upon the scalenus anterior which it obliquely crosses and where it is well separated from the carotid sheath and the associated vagus and descendens hypoglossi. The incision is deepened through the superficial fascia and platysma to the lateral margin of the sternocleidomastoid which is retracted medially the layer of fat lymph glands and deeper fascial layers penetrated exposing the surface of the scalenus upon which the nerve is usually to be found. Lateral to the scalenus are the cord of the brachial plexus medial the internal

pathetic fibers from the cervical and planchnic nerves and also in 80 per cent of person by the accessory phrenic coming from the fifth cervical root. As the simple phrenicotomy of Thiersch may fail to give the complete unilateral paralysis of the diaphragm desired this operation has been supplanted by the radical phrenicotomy of Goetze in which the accessory phrenic



Fig. 394—Roentgenogram—Case IV—showing accessory phrenic nerve. The accessory phrenic nerve is seen as a faint line running vertically along the inner border of the rib cage, just medial to the main phrenic nerve. The diaphragm is visible as a dark, horizontal band at the bottom of the image.

is located and also divided. The nerve runs with the subclavius. In turn radical phrenicotomy to the possible difficulty in locating and dividing the accessory phrenic nerves has been supplanted by the phrenicocoele of Felix in which by avulsing preferably 1.5 cm. more of the peripheral portion of the phrenic nerve the point of junction between the

phrenic and accessory phrenic—which usually lies between the first rib and root of the lung—is destroyed. This operation insures a complete paralysis of the corresponding half of the diaphragm. The paralyzed diaphragm then rises in the chest reducing the ipsilateral thoracic cavity from one fourth to one third. The operation increases the effect of a previous artificial pneumothorax or it may be used as in the two cases cited when pneumothorax by reason of pleural adhesions or other cause cannot be accomplished. Both of the patients here presented have apparently been decidedly benefited by the operation. In one patient the cough and expectoration immediately stopped after the diaphragm was paralyzed.

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jugular vein below the omohyoides. Upon the scalenus running obliquely downward from its lateral to its medial border the phrenic nerve is located. On pinching the nerve one or more of the following effects may be noted: pain referred to the shoulder, upper arm, chest wall or neck on the same side or to the heart or diaphragm; spasmodic fluttering of the diaphragm; contractions of the ipsilateral lower thoracic wall; dilatation of the corresponding pupil or singultic movements. If the proximal portion of the nerve has been blocked by the injection of a local anesthetic these effects may be modified. Rather rarely the phrenic passes through the substance of the scalenus and is more difficult to locate. Having positively identified the nerve—after several deaths have occurred where the vagus was mistaken for the phrenic and avulsed—the nerve is divided and the peripheral portion is slowly and cautiously wound upon a hemostatic forceps, one complete turn of the forceps being made each minute. With care from 12 to over 27 cm. of the nerve may be withdrawn before it ruptures. It is preferable to avulse at least 17 cm. to insure the division of all fibers of both the phrenic and accessory phrenic. By infiltrating the region of the third, fourth and fifth cervical roots the pain of the avulsion is prevented. Rarely severe bleeding may occur from rupture of the pericardiophrenic artery within the chest especially if the nerve has been roughly withdrawn. To produce a temporary paralysis of the phrenic it may be frozen by ethyl chloride injected with 5 per cent phenol or by alcohol or crushed (phrenemphren). The operations have also been used for convulsive tetanus, spasm of the diaphragm from encephalitis or other causes, intra-thoracic pain from adhesions of the diaphragm and to prevent bronchiectasis following a postpneumonic fibrosis or to overcome functional effects due to displacement of the heart from pulmonary fibrosis (Davies). The operation is chiefly used to compress the lung rather than hemorrhage prevent absorption of secretion from the upper portion of the lung and the lower lobes less effusions facilitate expectoration and to prevent the stagnation of secretions especially the lower lobe.

## SPONTANEOUS PROGRESSIVE PNEUMOTHORAX FOLLOWING ARTIFICIAL PNEUMOTHORAX

C V—M G H g th rty y m d ll p  
 Ch f C mpl t—I h t pe t t h m pty l f ght  
 dy p  
 P et H t y—I 1926 p t t t k w th p lm y h  
 l g l i ght d lght gh W th d g f p lm ry  
 t be l h t d T b l C mp h h p d d w  
 l sch g d y l t t d case l 1927 t p lmo  
 h m h g s l h t t t camp h h ma d ght m th  
 f m th l t ft t g h m h h d f th h m  
 h g f f h m h g h t l t camp d r t f l p m  
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 Op l O t be l 1928—W th t f S m f th se th d  
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**Comment** Spontaneous progressive pneumothorax occasionally occurs after crushing injuries of the chest or in the course of pulmonary disease and also has been reported by Cairns after complete paralysis of the diaphragm from operations on the phrenic nerve. It is a very important and if unrecognized a very dangerous complication of artificial pneumothorax. The opening from the lung into the pleural cavity may be traumatic as when the lung is perforated by a needle or a fractured rib or a rupture may occur through an emphysematous area or be due to an ulcerative process which perforates the visceral pleura.

jugular vein below the omohyoides. Upon the scalenus running obliquely downward from its lateral to its medial border the phrenic nerve is located. On pinching the nerve on or more of the following effects may be noted: pain referred to the shoulder, upper arm, chest wall or neck on the same side or to the heart or diaphragm; spasmodic fluttering of the diaphragm; contractions of the isolated lower thoracic wall; dilatation of the corresponding pupil or ingulfic movements. If the proximal portion of the nerve has been blocked by the injection of a local anesthetic the effect may be modified. Rather rarely the phrenic passes through the substance of the scalenus and is more difficult to locate. Having positively identified the nerve—for several deaths have occurred when the vagus was mistaken for the phrenic and avulsed—the nerve is divided and the peripheral portion is slowly and cautiously wound upon a hemostatic forceps one complete turn of the forceps being made each minute. With care from 12 to over 27 cm. of the nerve may be withdrawn before it ruptures. It is desirable to avulse at least 12 cm. to insure the division of all fibers of both the phrenic and accessory phrenic. By infiltrating the region of the third, fourth and fifth cervical roots the pain of the avulsion is prevented. Rarely severe bleeding may occur from rupture of the pericardiophrenic artery within the chest especially if the nerve has been roughly withdrawn. To produce a temporary paralysis of the phrenic it may be frozen by ethyl chloride or etched with 5 per cent phenol or by alcohol or crushed (phrenephrenia). The operations have also been used for convulsive tetraparesis of the diaphragm from encephalitis or other auscultable hemothorax from adhesions of the diaphragm and to prevent bronchiectasis following a postpneumothorax. The functional effects due to displacement of the heart in pulmonary fibrosis (Davies). The operation is helpful to compress the lung, relieve hemorrhage, prevent atelectasis, secrete from the upper portion of the lung into the lower lobes, lessen effusions, facilitate expectoration and to prevent the stagnation of secretion especially in the lower lobe.

# MUSCULOSPIRAL PALSY FOLLOWING TREATMENT OF MALARIA BY INJECTION OF SODIUM CAC ODYLATE EXTENSOR PARALYSIS OF THE FOOT FOLLOWING INJECTION OF ALCOHOL FOR SCIATICA

Ca VI—M F F g fifty ght y Im tt d 4/2 /29  
Ch f C m pl t—l e f t t l p f m m s c l p l p a l y  
P e i H t y—O J a r y 2 1929 s o l m c a c o d y l t j t  
ma l t h l t l f f t h l f t m d g t h o s e f t t m t  
f m a l t h m d t m a k d c o t c t f t h t s o m u s c l  
f t h t d f g e f l l b y p l y f t h t s o m s c l f t h  
t d h a l l t d p N s e s o r y l m t h b e e t d  
O p t 4/26/29—S t c m l t l l b l a l w t h  
p o s f t h m u s c l p l l b e t l b d l s e p t d d  
d s a s o t d f l t f l l m T h l l t d h t d  
t h t d f t t h k g f t h h t h l t h l f t f t h m d t h d  
f t h m t h l g h t t h k g f r l t f 4 t 5 m h t h  
e l d l l m t d l s c d D t t b l l f d  
b o d b e l t h A f t t h h s a s t h p l c e d  
t m l p l h l l s e l t h t l a g l o c k p  
p l t p l l  
M 10 1929—f t t l l t t d t h f g l l b e g g  
p o f t f h h l F l t c t f l h  
d l p s e

C VII M A A g f f h t d  
Ch f C p l t—l l k s c t l g t h e f o o t  
P e i H t y—F g d f t f t h l t l g  
b e l t l k t h t l f h f s c t c a d l p e l l S e p  
t l 19 7 j t f l h l m l t h g f t h g h t  
t r t h t f l N b e 1927 t h j t p e t d  
f f l d l y p a l l f f m j l t l l t y t d f l t h  
f o o t s a m t l s a k l g l d d e m f f  
g h t h g h d f t h l l l t l k d m j l t l o s f t s o  
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D g —l t l l f h l s c t e  
p e l 3 26 29 s e e c p o t d f t h  
f l l f t l f t t o c k h p h t h k l l d s c t r s p o s e d f  
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s o d k f h l d l p l t t t h l l f h  
f l l f h t t a c k f l f l T h l h d t t h l  
f t l f b e s p s l l l s o c t e d f l c e f 12 c m f t  
m o d l t h k l  
VOL. 9—C



On expiration and cough air enters the pleural cavity and may progressively compress the lung displace the mediastinum and heart and finally so compress the opposite lung as to cause apnea unconsciousness and death. It is most important to recognize the condition in the early stages because the patient's life hinges upon the prompt removal of air from the chest as in the case of this patient. If the condition recurs or progresses despite aspiration thoracostomy and the introduction of a tube into the pleural cavity are required. If infection has not already spread to the pleura from the lung attempts should be made to remove the drain early and before the development of pyothorax. Often however the development of a pleural infection necessitates free and continual drainage. Obviously Dakin's solution or other liquid should not be introduced into the cavity of the chest while there is an opening into the lung.

# MUSCULOSPIRAL PALSY FOLLOWING TREATMENT OF MALARIA BY INJECTION OF SODIUM CACODYLATE EXTENSOR PARALYSIS OF THE FOOT FOLLOWING INJECTION OF ALCOHOL FOR SCIATICA

C VI—M F F g fifty ght y lm tt d 4/2 /29  
 Cf fC mpl t—Left ! pf mm sc l p l pa ly  
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 Op t 4/26/29—S tee -cm l t l m ll h l th  
 po f th m l p l lb t l l dl sep t d d  
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 f tl m th l k l t th k g f d t f 4 t 5 m wh th  
 e l ll l mat l l sc l D t ct l dl w f d  
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 M y 10 1929—P t t bl t t l th f g d h beg g  
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C VII—M A A g fifty h t w d  
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**Comment**—Last year we reported a case of musculospiral paralysis following the injection of a solution of quinin and urea into the arm in the treatment of pneumonia. These two additional cases in which peripheral nerve paralysis followed therapeutic injection of drugs are cited as indicating the care that should be taken as to the site of injection of medicinal substances that may have a destructive effect upon the motor nerves. It is important in all cases where the paralysis persists to expose the affected nerve by operation to open the sheath free adherent fibers and place the damaged nerve in a vascular musculor bed from which it may acquire a new source of blood supply. Rarely the destruction may be so extensive that resection of the nerve and suture may be required.

# CLINIC OF DR. CHARLES F. NASSAU

## JEFFERSON HOSPITAL

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### TREATMENT OF GASTRIC AND DUODENAL ULCER

THE institution of proper treatment for gastric and duodenal ulcer depends largely upon whether or not the patient has chosen a surgically minded internist. Medical treatment is advocated chiefly by physicians who specialize in gastroenterology and these men claim excellent results particularly in duodenal ulcer and in the non-obstructing type of gastric ulcer.

Having established the presence of ulcer by the clinical symptoms, gastric analysis and x-ray studies it is entirely proper to try a course of medical treatment in duodenal and non-obstructing pyloric ulcers. This must not be too prolonged however on account of the possibility of perforation. It must be remembered too that ulcers are peculiarly prone to seasonal variations and therefore one may be deceived by apparent medical cures, recurrence of symptoms after temporary improvement under medical treatment being very common. Furthermore while ulcers may heal under medical treatment in the process of healing a surgical lesion may result such as pyloric stenosis or hour glass constriction, the former sometimes occurring in duodenal ulcer and the latter in gastric ulcer.

After deciding upon the wisdom of medical treatment every possible focus of infection should be eliminated. The percentage of failure to cure in cases treated medically varies from 67.3 per cent (Balfour) to 57 per cent (Lorman). In view of such figure we must recognize that medical treatment is at present unsatisfactory and that the safest and surest method of cure is surgical.

Pathologically gastric and duodenal ulcer present somewhat similar processes. Since the practice of subtotal gastrectomy much more has been learned from the gross and micro

scopic study of specimens than was possible from necropsy material. From a detailed histologic study of a large number of duodenums and stomachs removed at operation there is apparently no evidence that the defect in the mucous membrane depends upon nutritional disturbance. On the contrary, where differentiation is possible inflammatory mucosal changes predominate as the outstanding microscopic picture.

Many observers speak of gastric and duodenal ulcer as one and attribute their development to extensive infection with points of ulceration and lymphatic infiltration or to aseptic or mildly infective emboli which involve the smaller vessel and which may present thrombi. True pyloric ulcer is very rare. In a series of 2000 chronic gastric ulcer cases Moynihan reports that less than 3 per cent of them were at the pylorus or within 1 inch of it. There are certain fundamental differences between duodenal and gastric ulcers and the pyloric vein is commonly used as a dividing line. The chemical condition of the stomach is the same in either type of ulcer. In duodenal ulcer perforation and hemorrhage are more frequent but there is a greater tendency toward malignancy in gastric ulcer. It is still unsettled as to whether the extensive inflammatory changes develop before or after the appearance of the ulcer.

The conception of ulcer formation on the basis of pyloric spasm was first advanced in 1897 by Mikulicz and the reasonable evidence upon which to base the theory that pyloric spasm may be at least one of the chief causes in the development of both gastric and duodenal ulcers. The frequency of pyloric spasm both in the infant and in the adult is known to every clinician. It interferes with the normal emptying of the stomach and brings about a definite state of gastric retention. Intermittent or continuous spasmodic contractions occur also at other sphincter sites—spasm of the *cardia* which produces an *ophoroid* dilatation and spasm of the sphincter papilla (papilla of Oddi) which causes dilation of the common and hepatic duct. The neurogenic theory as to the cause of the occurrence of ulcers must be ignored although it is of distinct interest from a surgical viewpoint.

This brief discussion of a few factors which are related to the genesis of gastric and duodenal ulcers is presented as evidence of the unsettled status of the entire problem. Certainly within the last ten years nothing of importance has been added to our knowledge of the etiology of ulcer.

In nearly every case the development of ulcer is found to be the result of a definite inflammatory destruction of the mucosa. In many places the normal surface presents evidence of healed ulceration but frequently this is limited to the superficial layer. This process is most advanced in the antrum of the stomach and in the duodenal bulb. In brief all cases show more or less advanced chronic gastritis or duodenitis in various stages of development. These are common findings in the hands of most observers.

The appearance successively or simultaneously of two or more ulcers in a patient has been termed clinically spontaneous double ulcer. In from 5 to 10 per cent of cases ulcers are multiple and in some instances the coexistence of an ulcer in the stomach and in the duodenum is observed in the same specimen.

The surgical treatment has of course been commented upon from numerous angles. The variable phases in the treatment depend to some extent upon the etiology of the condition. For some time past there has been a definite tendency toward radical surgery in all ulcers but since their etiology is so far from being settled the type of operation cannot be standardized. In the light of our present knowledge no attempt should be made to use one certain operation for the treatment of every condition. Only practical experience and clinical results which have been observed over a long period of time can form a basis for rational treatment. The type of operation to be performed depends upon a number of factors of which the most important are the location and character of the ulcer, the general condition of the patient, the possibility of malignancy of the ulcer and the degree of gastric acidity.

Posterior gastroenterotomy always has given and I believe will continue to give the highest percentage of cures. In the beginning surgeon began to treat these ulcers by gastro

enterotomy then turned vigorously to partial gastrectomy and now the pendulum has swung back to gastro-enterotomy. Ulcers at or near the pylorus are readily cured by this procedure. Of all the ulcers which come under the care of the surgeon it is in this condition accompanied by obstruction that he achieves his most brilliant results. In simple ulcer of the duodenum it is better to deal with the ulcer directly and follow by gastro-enterotomy. In cases of healed duodenal or gastric ulcers with constriction of the pylorus Finney's pyloroplasty has given me most excellent results and in this type of case pyloroplasty is I believe the procedure of choice. The operation must be performed without clamp after application to the wall of the duodenum; not without danger of necrosis of the bowel as occurred to me in one patient. It is to be remembered however that Finney's pyloroplasty is a much more difficult operation to perform than gastro-enterotomy and should not be attempted by anyone who is unskilled in this type of work.

*In the middle type of ulcer and in ulcer of the lesser curvature* which are occasionally multiple partial gastric resection is to be preferred in combination with Billroth I if possible technically or if not an operation of the Polya type. Simple gastro-enterostomy laid on posteriorly or even anteriorly should not be undertaken after partial gastric resection if it can be avoided. After all the conscientious surgeon will perform that operation which in his hands exposes the patient to the least possible risk commensurate with the probability of improvement in health. Do not perform an operation upon any patient because it can be done but rather choose a type of operation suitable to the patient's local and general condition which will give him the best chance of recovery.

The success of gastro-enterotomy depends upon (1) Removal of foci of infection previous to operation (2) actual demonstration of an ulcer (3) careful technique (4) postoperative care. In competent hands the mortality is now about 1 per cent.

In one series of over 100 gastro-enterotomies there were 90 per cent of cures. Pyloric exclusion was not used in these cases in combination with the gastro-enterostomy. In 1911 Christman

Bull in a critical discussion of 94 cases with x ray follow up notes stated that better results were obtained without pyloric exclusion and a number of Continental surgeons who formerly adopted some type of pyloric exclusion to the gastro enterostomy have long since abandoned it.

Excision of a duodenal ulcer is not made a routine part of the surgical procedure although occasionally in ulcers of the anterior wall cautery destruction apparently gives excellent results. One must never forget the possibility of reflex spasm of the pylorus from the resultant scar. Bull says that excision of the ulcer gives the least favorable results most of his patients so treated being recorded as unimproved.

In 1921 Clairmont observed before the German Surgical Congress that there was no great difference in the end results between gastro enterotomy and the various types of resection. Bull notes that the results of his operations are always better after gastro enterotomy than after resection this with no regard to the localization of the ulcer. On the other hand Finsterer who routinely removes the greater part of the stomach in both gastric and duodenal ulcer claims clinical cures in all of his cases. It is difficult to reconcile these opposing statements except by one's own experience but I feel very strongly indeed that we have no right to expose a patient to the higher mortality of a gastric resection when a much safer procedure will accomplish the same end.

The outstanding complication of gastro enterostomy is the development of gastrojejunal ulcer. This crippling lesion has caused a considerable number of surgeons to adopt partial gastrectomy as the operation of choice in all gastric and duodenal ulcers. While the mortality of partial gastrectomy is surprisingly low and the immediate results most satisfactory the incidence of gastrojejunal ulcer is not absolutely eliminated and the operation is not without other dangers. If the occurrence of jejunal ulcer is dependent upon acidity at least two thirds of the stomach must be removed at operation. Ilaasch in a study of the histology of the stomach found that the acid cell began at the cardiac end of the stomach and extended for about



two thirds of the distance of the lesser curvature and three-fourths of the distance of the greater curvature ending in a very sharp line at the above points. If a partial gastrectomy be performed in order to produce a certain anacidity the greater part of the stomach must be resected.

Figure on the postoperative development of jejunal ulcer vary from that of the Massachusetts General Hospital which reports 1 per cent jejunal ulcer to Berg and Lewisohn who record 25 per cent jejunal ulcers. Moynihan reports 3 to 4 per cent. In my own practice I doubt that more than 2 per cent develop jejunal ulcers.

The treatment of gastrojejunal ulcer consists of a gastrectomy beyond the point of anastomosis and reanastomosis of the jejunum to the stomach. Finsterer recently has given up the anastomosis of Roux because of two recurrences following the latter type of operation.

It has been generally assumed that gastrojejunal ulcers do not occur after partial gastrectomy but there are reports appearing that resection of the stomach does not entirely eliminate this hazard. Probably the incidence of jejunal ulceration is less after resection than after gastro-enterotomy. Walton reports 2 cases following partial gastrectomy by other surgeons and similar incidents are reported by Beer. Von Haberer has abandoned the Billroth II in favor of Billroth I as he found gastrojejunal ulceration so common after the former operation. Wright reports 2 similar cases and notes that up to the present time gastric resection has been reserved for gastric carcinoma. It is only in recent years that partial gastrectomy has been carried out in the treatment of peptic ulcer and jejunal ulcers are now beginning to appear. Walton states the real doubt that this serious complication is entirely eliminated by the substitution of the more dangerous resection. Finsterer mentioned seven gastrojejunal ulcers following partial gastrectomy which had been performed by other surgeons.

Gastrojejunal ulcer predominates in the male and is most commonly observed after pyloric and duodenal ulcer. Mandl and Holbuhm have never observed such an ulcer till within

ulcer of the middle of the stomach. In Walton's series of 70 cases only one gastrojejunal ulcer developed after an ulcer of the lesser curvature and this instance was associated with a very high gastric acidity.

An interesting article by Allen in the American Journal of Surgery 1928 which discusses postoperative jejunal ulcer says that the cause of ulcers near the suture lines after gastroenterostomy is unknown. Many theories based upon mechanical considerations have been advanced among which are the use of clamps, nonabsorbable suture material, too small a stoma, or one not well placed, an infected hematoma in the suture line, focal infection, and operation performed in the absence of a pathologic lesion. Allen reports 4 cases that showed the tendency of certain persons to develop ulcers regardless of the procedure used and I have one interesting case of my own.

In 1913 I saw a patient, a man fifty-two years old, who gave the following history: Within a period of less than a year he had lost nearly 50 pounds in weight. Vomiting was increasingly frequent and he had marked retention of food in the stomach. The x-ray report showed complete basin-shaped retention as late as twenty-four hours in a large dilated prolapsed stomach. Abdominal palpation was easy owing to his extreme emaciation and a large mass was felt in the region of the pylorus. I made a preoperative diagnosis of carcinoma of the stomach and operated upon him on May 1, 1913. The entire pyloric end of the stomach was occupied by an immense mass approximately (x9 cm and 15) fixed so as to be immovable. A short loop posterior gastroenterostomy was made and the patient had an extraordinarily easy convalescence. On August 1, 1913, he reported at my office saying that he was feeling fine, was able to eat and digest practically everything, and that he had almost reached his normal weight of 160 pounds.

I hear from him both directly and indirectly over a period of years, and in 1918 follow-up fluoroscopic study showed that the gastroenterostomy opening was functioning satisfactorily. There was no evidence of narrowing or tender areas. The pylorus was closed.

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Figure on the postoperative development of jejunal ulcer vary from that of the Massachusetts General Hospital which reports 1.7 per cent jejunal ulcers to Berg and Lewisohn who record 25 per cent jejunal ulcers. Moynihan reports 3 to 4 per cent. In my own practice I doubt that more than 2 per cent develop jejunal ulcers.

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Gastrojejunal ulcers predominate in the male and are most commonly observed after pyloric and duodenal ulcers. Mandl and Holbaum have never observed such an ulcer following an

almost complete gastric retention at twenty four hours Physical examination was negative no mass was palpable

Operation under morphin scopolamin and nitrous oxid anesthesia December 1921 The abdomen was opened through the upper left rectus muscle as I wished to avoid having to separate adhesions in the twice previously opened abdominal wall The stomach was very large A large mass (ulcer) was found at the pyloric end of the stomach involving a portion of the stomach and the duodenum as well The condition was almost the same as that found at the first operation Without the use of clamps an anterior gastro-enterostomy with the long loop was made and an entero-enterostomy laid on the loop leading from the gastro-enterostomy at a point 4 inches from the beginning of the jejunum and at as low a level as possible Convalescence was again normal and he was discharged on January 15 1928 in most excellent condition

He has remained well up to the present time eating normally and has no gastric distress If he should develop another ulcer it is difficult to say what further procedure could be undertaken unless the mass at the pyloric extremity of the stomach has again disappeared and conditions lend themselves to a resection of at least the right half of the stomach

Partial gastrectomy is seldom if ever indicated in duodenal ulcer and is indicated in gastric ulcer chiefly because of the danger of malignant degeneration

It is interesting to see from time to time reports on the number of recurring ulcers following partial gastrectomy In the Annals of Surgery last year Balfour reported 28 ulcers following partial gastrectomy found at subsequent operation In 14 cases the ulcer followed resection for gastric ulcer in 8 cases resection for reactivated duodenal ulcer following other operations and in 6 cases resection for gastrojejunal ulceration Classifying the lesions according to operation 3 followed resection of the Billroth I type 6 followed resection of the Billroth II type 10 followed ileo-c resection 7 a Polya operation of the posterior end to ile type and 2 followed resection completed as an anterior end to ile gastrojejunostomy Balfour

The patient remained entirely well until February 1923 when he began to have a return of symptoms which were to some extent relieved by the use of alkalis. The general examination was entirely negative. x Ray examination showed a jejunal constriction near the gastro entero tomy opening, with marked localized tenderness. The diagnosis was obstructive jejunal ulcer.

At operation July 1923 the abdomen was opened through the old scar. After the release of numerous adhesions the opening of the gastro entero tomy was brought into view. The tomy was occupied by a huge ulcer in which the jejunum was involved to a far greater extent than the stomach and which extended over a considerable area. The stomach wall had a comparatively small amount of involvement. By using part of the stomach wall to repair the jejunum the anastomosis was released and the stomach and jejunum securely closed. A resection of the diseased jejunum was out of the question on account of the involvement of the wall of the small bowel which continued up to its emergence through the transverse mesocolon.

At this point in the operation an incision was made of the pyloric end of the stomach and here a curious condition was found. During the healing of the original ulcer, an almost total obliteration of the pylorus had taken place over a distance of slightly more than 6 cm. The remaining only a narrow mucous membrane lined tube through which it would not have been possible to introduce anything larger than a lemonade straw. I was therefore immediately concerned with the necessity of remedying this defect as the gastro entero tomy had just been disconnected. The simplest and most reliable procedure was the performance of a Finney's pyloroplasty which was done as rapidly as possible owing to the extremely bad condition of the patient.

An ideal convalescence followed free from complications of any kind and the patient left the hospital in August 1923. He remained well until December 1924 when he was again admitted to the hospital complaining of vomiting. x Ray examination showed no obstructive lesion of the pylorus. He had

oxygen and oxygen may be well borne but it is not the method of choice if some other form of anesthesia can be successfully employed. With the newer developments in spinal anesthesia which make it apparently a safe procedure most posterior gastroenterostomies can well be carried out in the limited time given by this form of anesthesia. However if the question of gastric resection must be considered splanchnic anesthesia by the method of Braun should be used in preference to any form of inhalation. As a matter of fact with the help of carefully administered morphin and scopolamin a large number of individual will require nothing more than local anesthesia of the abdominal wall.

Use a right pararectus incision and first inspect the gall bladder and appendix. If the ulcer be not readily found open the lesser peritoneal cavity. Inflammatory changes are not uncommon here and it is possible to overlook an ulcer on the posterior surface of the stomach unless this is made a part of the surgical procedure. Usually the exposure of the bursa omentalis is most easily effected through the gastrocolic omentum occasionally adhesions make it difficult.

The incision in the mesocolon should be made as close as possible to the vertebral column. The edges of the mesocolon are fixed to the stomach by a number of sutures before the anastomosis is begun. Either fine silk or fine chromic catgut is used for the peritoneal approximation. Personally I feel that it is safer to use silk for the peritoneal suture and hard tanned catgut since with the needle swivel upon the end of the suture for the inner layers. Care must be taken to bring about absolute apposition of the mucous coat so that no gap remains between the stitches. If the mucous membrane of the stomach is very recalcitrant at the opening a small strip may be excised.

In recent years I have not been doing a strictly no loop operation in pyloric and duodenal ulcers but place the opening 2 or 3 inches from the duodenojejunal flexure. The experience of operating upon a number of gastrojejunal ulcer cases where the no loop operation failed in the primary procedure led me to abandon the strictly no loop operation. No ill-effect has been

says that the cause of these recurrences cannot be established since recurrence takes place when every known factor has been eliminated.

Hurt put special stress upon the late complications which follow partial gastrectomy and has even claimed that it may be followed by pernicious anemia. He states that he knows of 5 such cases where this complication occurred. He also says that there is in literature 100 cases of secondary ulcer after partial gastrectomy. Whether or not these claims will be substantiated it is evident that removal of large portions of healthy stomach may be followed in the future by grave complications. In spite of statistical evidence which shows a very low mortality in the hands of the skilful surgeon Walton says that the mortality in partial gastrectomy will be higher than the combined mortality of gastroenterotomy and the incidence of gastrojejunal ulcer after such an operation and the follow up in this type of operation for duodenal ulcer has no better general results than posterior gastroenterotomy.

The symptom of recurrent ulcer parallel the one of primary ulcer in one important respect. Pain regardless of its situation radiation or spread is related to the ingestion of food although I had one patient in whom the ingestion of food had no effect upon the pain which was absent when he was lying upon his back. In the erect position however pain was present and was accompanied by diarrhea.

Considerable variation of opinion is expressed by the observers concerning the possibility of malignant change in existing ulcer. Von Haberer states that it occurs in 1 per cent of cases and other opinions vary from practically none to as high as 30 per cent. Cole states that the greatest uncertainty on a previous ulcer is a most unusual event but this opinion upon the result of continued activity.

### TECHNIC OF OPERATION

General anesthesia should be employed although undoubtedly there are some patients who are in such excellent condition that the usual operation under half hypnosis is sufficient.

oxygen and oxygen may be well borne but it is not the method of choice if some other form of anesthesia can be successfully employed. With the newer developments in spinal anesthesia which make it apparently a safe procedure most posterior gastroenterostomies can well be carried out in the limited time given by this form of anesthesia. However if the question of gastric resection must be considered splanchnic anesthesia by the method of Braun should be used in preference to any form of inhalation. As a matter of fact with the help of carefully administered morphin and scopolamin a large number of individual will require nothing more than local anesthesia of the abdominal wall.

Use a right pararectus incision and first inspect the gall bladder and appendix. If the ulcer be not readily found open the lesser peritoneal cavity. Inflammatory changes are not uncommon here and it is possible to overlook an ulcer on the posterior surface of the stomach unless this is made a part of the surgical procedure. Usually the exposure of the bursa omentalis is most easily effected through the gastrocolic omentum occasionally adhesions make it difficult.

The incision in the mesocolon should be made as close as possible to the vertebral column. The edges of the mesocolon are fixed to the stomach by a number of sutures before the anastomosis is begun. Either fine silk or fine chromic catgut is used for the peritoneal approximation. Personally I feel that it is safer to use silk for the peritoneal suture and hard tanned catgut size 0 with the needle swedged upon the end of the suture for the inner layers. Care must be taken to bring about absolute apposition of the mucous coats so that no gap remains between the stitches. If the mucous membrane of the stomach is very reluctant at the opening a small strip may be excised.

In recent years I have not been doing a strictly no loop operation in pyloric and duodenal ulcer but place the opening 2 or 3 inches from the duodenojejunal flexure. The experience of operating upon a number of gastroduodenal ulcer cases where the no loop operation had been the primary procedure led me to abandon the strictly no loop operation. No ill-effect has been



noted since adopting the use of a 2 or 3 inch loop. Walton believes that we have been obsessed with the idea of the value of the no-loop anastomosis owing to the evil effect which unquestionably follows the use of a very long loop. The stoma is placed from right to left from the greater curvature upward toward the left. The distal end of the jejunum is approximated to the greater curvature. The anastomotic opening is usually made 3 to 3½ inches from the pylorus.

In the technic of resection the most important step is the satisfactory mobilization of the stomach. As a rule the removal of the stomach is begun at the duodenal end. It is important that the line of resection be carried out in normal stomach wall. The duodenum is crushed with Payr's clamp, a silk ligature tied in the groove and the end inverted with interrupted sutures preferably of the mattress variety. It is important also in the inversion of the duodenum to effect its closure in healthy tissue if necessary a part of the stomach even proximal to the pylorus may be utilized for the site of the inversion. Occasionally one is able to approximate the lumen of the stomach and duodenum without tension in this case continuity is established by the Billroth I but usually a dangerous angle is formed and the suturing is insecure. When possible the resection is completed by anastomosis of the entire end or the lower half of the transverse section of the stomach to a short retrocolically placed jejunal loop.

#### POSTOPERATIVE TREATMENT

Following either gastro-enterostomy or resection the patient is given a Murphy drip and if indicated subcutaneous introduction of salt solution either at eight or twelve hour intervals or continuous hypodermochlorin, this depending upon the condition of the patient. Transfusion is resorted to if necessary. Morphine in small doses should be given if pain and discomfort are marked during the first twenty-four hours.

The use of ice or milk unless peptonized is absolutely contraindicated as a part of the postoperative treatment. If the absence of nausea or vomiting heralds the absence of hot water or tea are administered at the end of the first hour so that the patient

in the course of a day receives about 200 c c of fluid. This restriction of fluids by mouth is compensated by rectal and subcutaneous injection. From the third to the fifth day the quantity of fluids is increased. On the third day broiled steak may be chewed and the pulp rejected with extremely beneficial results. This brings about all physiologic processes and is therefore superior to the ingestion of broth or beef tea. On the fifth or sixth day I begin with soft pulpy food.

Gastric lavage is occasionally necessary if nausea or vomiting persists. The fluid obtained is often blood tinged which may have its source from the suture line or in a remaining ulcer. It is often possible to avoid the use of gastric lavage by the administration of a Seidlitz powder. If the latter fail to afford relief resort is then made to the stomach tube. The lavage must be carried out under low pressure and only a small quantity of fluid (200 to 400 c c) used. This is well tolerated and the result most gratifying. I have seen no adverse effect of its use in my experience.

If the operation of gastro enterostomy could be avoided and a simpler method used by means of which the healing of the ulcer might be achieved with certainty and without future complications we should undoubtedly obtain a tremendous improvement over our present postoperative results. In line with this thought within the last year or so both in this country and abroad a few surgeons have been trying out an operation which consists of partial excision of the pyloric sphincter in other words a glorified Jammstedt operation. As yet however no one has used this procedure in a sufficient number of cases or over a long enough period of time to be able to arrive at any conclusions concerning its real value.

The surgery used in the treatment of gastric and pyloric ulcers should always be made as safe and as simple as is possible and it is my feeling that except in instances noted under certain types of gastric ulcer a gastro enterostomy offers the patient the greatest hope of cure at minimum risk. While it is not a panacea the mortality is low the results are certain in the majority of chronic pyloric and duodenal ulcers and patients remain well a full year followed from year to year.

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## CLINIC OF DR. I. TURNER THOMAS

NORTHEASTERN HOSPITAL

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### PRIMARY CLOSURE OF THE WOUND IN COMPOUND FRACTURES

THE immediate closure without drainage except between the skin sutures of the ordinary compound fracture especially that with a small wound of the skin over the seat of fracture not larger than could be accounted for by the protrusion of a fragment of the fracture and usually with no bruising or other sign of direct trauma is justified by the results in the writer's experience. A presentation of this view with cases to support it was read before the American Medical Association and published in the Journal of the Association on August 5, 1922. A few selected cases will be offered here from the writer's experience since that time. He believes that most fractures are due to indirect violence compounded as well as simple fractures and that the compound wound is nearly always due to the protrusion of a fragment of the fracture through the skin. The 2 cases involving the femur here reported were probably due to direct violence but the compound wound in both was probably due to the protrusion of a fragment.

The general tendency has been to agree with the view that all compound fractures are potentially infected. The writer prefers to consider that nearly all of them are potentially clean that what we have to control is a small amount of infection picked up by the protruding fragment and the small wound. Though the wound is usually small in the skin it increases in size at the site of fracture where it is usually very extensive due to the forcing apart of the fragments immediately following the fracture when one of them is being thrust through the skin. The small amount of infection unless quickly and effectively con-



that they then offer a substantial resistance to the lengthening of the limb necessary to permit the fragments to become accurately replaced.

If one applies sufficient traction for immediate complete reduction by the closed method the effect of this resistance may become visible in a whiteness of the skin in some areas indicating impaired circulation. This will usually disappear soon if the traction is maintained but in one of the writer's compound fractures<sup>1</sup> reduced by the closed method a large area of skin and subcutaneous tissue sloughed away complicating the healing greatly and resulting in considerable permanent deformity. This led to the use of the open methods in succeeding cases which developed somewhat similar troubles. After accurate reduction and fixation of the fragments on attempting to close the wound one found that considerable tension must be applied by the sutures. The incision is made in the thin poorly nourished tissues overlying the tibia deprived of some of its nourishment further by detachment from the tibia for exposure and application of the plates and screws. Not infrequently on tying the skin suture the immediately surrounding skin becomes pale from the effect of the suture tension on the circulation. Without local or constitutional signs of infection the sutures tend to cut through the tissues the wound margins to gape and the plate screws and fragment surface to become exposed. The open wound thus created usually takes a long time to close often months.

But there is a very important difference between the breaking down of the wound and that commonly seen in compound fractures in which the infection involves the whole fracture line and surrounding wound and tends to invade the surrounding tissue and form sinus behind and at the side of the limb which usually take many months and sometime years to close. This wound is mainly a superficial one extending from the anterior surface of the bone to the skin. The soft structure posteriorly and at the sides are adherent to the bone everywhere no wound discharge coming from the fracture line the side of the fragment

trolled will soon involve the whole cavity. To swab out the whole wound cavity with tincture of iodine may be unnecessarily severe treatment but the writer has been using it for about ten years and has had no trouble from it and does not have as much confidence in the effectiveness of any less severe antiseptic. Its irritability is much neutralized by following it with alcohol.

The thoroughness of the fragment immobilization plays an important part in the healing of the wound in a compound fracture or in the open treatment of simple fractures. Perfect immobilization is practically impossible even by plate and screws. Powerful muscles tend to move the fragments on each other often against plate and screw fixation and sometimes loosen the screws bend or break the plate with a breakdown of the wound which is aggravated as the loosening of the fragment increases. Plates and screws are used almost exclusively in operations upon fractures of the compact shafts of the long bones and the screws are commonly made to pass through only to the medullary cavity; through one layer of the compact bone. A more firm fixation is obtained when they go through the whole bone and both layers of compact bone and the medullary cavity. Disinfection of the wound and immobilization of the fragments are the most important factors in the treatment of compound fractures.

While plate and screw fixation is the firmest it is not without its objections. The most common compound fracture is that of both bones of the leg and the fracture involves both bones but usually only the fracture of the tibia is compound. This is explained by the ease with which a tibial fracture permits perforates the thin covering tissue. The writer has found this the most difficult in which to obtain primary healing of the operation wound but believes this is due to something more than infection per se. The soft tissues muscles fascia and skin are normally just long enough to accommodate the length of the bones. Contraction of the muscles from the fracture irritation causes the bones to shorten as well as all the remaining surrounding soft structure. The leg becomes more or less rigidly infiltrated by blood and the products of the reparative inflammation so

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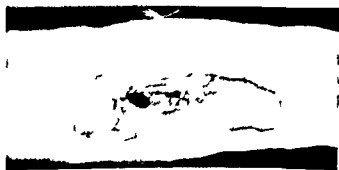
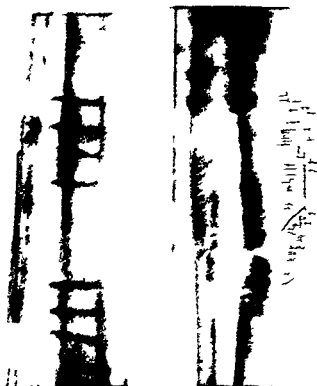


Fig. 15

or from the screw holes. The fracture line soon fill with granulation tissue as do the holes left by the removal of the screws.

We are not dealing here so much with an infection as with a necrosis of the superficial poorly nourished tissue and most of the dangers and difficulties of compound fractures have been overcome. Traction does not provide as good reduction or fixation of the fragment but in compound fractures of the leg is not associated with as much necrosis. The overlying thin poorly nourished tissues maintain the circulation derived through their undisturbed adhesion to the tibial surface. The degree of immobilization of the fragments varies with the degree of traction applied. The degree of its continuity is also important. The only kind of traction employed by the writer with the exception of the case involving the shaft of the humerus is that obtained by his traction cast described and illustrated for fractures of the leg in the issue of this publication for February 1921. Spence forbids a repetition of this description. Traction by a Jones splint was very successful in the compound fracture of the humerus (see Case II).

The following cases have been selected to illustrate the value in compound fracture of disinfection of the wound and immobilization of the fragments.

CASE I.—Compound Double Fracture of the Leg. Patient discharged with a good result. The wound closed without infection. The fragments were held in position by the traction cast. The patient was able to walk on the day after the operation.

CASE II.—Compound Fracture of the Leg. Patient discharged with a good result. The wound closed without infection. The fragments were held in position by the traction cast. The patient was able to walk on the day after the operation.

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 t g tl t t Al g l w t th cat th l  
 l t th l l g l t t po gtl l  
 f bout eek th t pe t 1 f m m l t bo t 102 F  
 l th pulse f 10 t 110 l m 1 l et cally mal f rw d  
 l t l t f l l 4/7 I t t m l 4/17 f ct f th  
 ou 1 l g 1 s N t ppl l Dsch g l 4/4 th t  
 R 1 m t l 6 19 28 f l l g f both bo es t th se  
 f f 6 20 A os t y f h ght g f th bo  
 sept l g f l l l ca Dsch g 17 5 28 C t  
 so ed l t ght eek lt l pe N f h 1 l l m l l  
 g

C IV—Alm t Id t l th C III Typ T tm t, d R  
 It —A se e tee y -oll y h 6 21 ed compo f f ct  
 f th l g l s u l bo l j hes l l gh ly  
 curved l n l 71 t f h l h ca 1 l  
 l et l l e m l ed C III l  
 l l l koe l l l l 11

A betw n open r luct n an l j lating a m Cases I an l II  
 n l close l r luct n an l fixat n b y tra t n a m Cases III an l  
 IV the v rter feels th t in hie j rience the clo el method ha  
 l m n trated it up r nity In another ca e now almo t com  
 pletely heal l al ut eight m ntl s after the acc l nt the com  
 j un l ng v un l a m j rctically all a e wa over the antero

d y lat th h l d pe ed Th l f fract mpl ly  
filled by h l h gr l is l p comes f m th m f th



scree h les f m th d p h t h les f h fragm Th l ch g  
h t com gf m h pe fi l ou d fee d h f f f

t ght mmed t l t th N rth st Ho-p l wh t m lea sed  
 th l l p p l t ct f od l t l g d g t w th  
 l h l l t l t t m p t t d f t th t f th w d t  
 l ce th f gm t p trud g l y t h l th knes Th w w d  
 th t b t l bo t l} hes long d l h d bleed g feely  
 ht m scl p trul g Th sec l malf w d th f bul  
 l bo t d h bo th kl d ly th f t f th fib l  
 H d m t t l t th h j t l b e t l l A x d p e t l bo t  
 l w F t p r t f t t ca t p r l e d w f f i c i t l y h d e d bo t  
 h l f h p o c e e d P t t t h e n th e d W d d l  
 g k l s e l th g s e p d l d th th b l e d  
 t t t f o d f l l l b y l h l l th h l f l l l p e t  
 l p e l th t l h e e t d t l Th t f th d w th  
 th h l l e l th th o d d l h l s e l t m Th f c t  
 th l e e d b y t t l t th t m a l l p t f th t d  
 l t p l t f th f gm t l l th g h th w l th e l k  
 m g u t t s e d t t p t b l s o m h m r r h g t l g a  
 t h l h l p r l e d t th l f l l e d l v m g d b d  
 g f th m l l y m p l t f th ca t

51 T m p e t c e y t l o s e t 10 F l p l t 128  
 l t t h l m h p l t g h t l t h l t l t o d y

52 H g h t t m j t c e y t l y 101 F p l e 130 A  
 h l c u d o u l p o s e d S l k m g u t t m e d A  
 f l l l l f g a s c p e d T m s c l s e d p e g m a d b y  
 m l f t e s N d f f c t d d g k  
 l h l l p o s e d Th k l o o k e d m a l h d t h s a m l f e e l  
 t l l g k l f l y m l l th d l y g b e t  
 t h f l t t d t T o e t l l l p a d o e  
 t m j l f m t l th l d s c o m f r t f m h j r y H g  
 p o p e th t l d t g g d b y th g l l l l th  
 t l l l t j p l y m t t f o d d p l y p o l l th  
 f l l l l t l g d g d t t l t h f l l g  
 m g

53 C l g c o l f k d t h d b e g d t c t l b l k  
 h h m l k l f i l d r y g d t a c e f m t h l d  
 l l f d b e l C t m e d q k l y p o s l l l  
 f l m l d f k l j p e r r t f l f j t h c o  
 l l l l T k t o p e g o o l g u l l m p l o n  
 l f r t l f t h g l O h f l l g l l l g f s e p l t l l l  
 l l f t s e f l l D s c h g e d 6 l l th g  
 l t g f l l h l o n g d j h l l o 2 h e s m f h  
 f l g l e d o n 6 l

C VL—C m p o u n d C o m m t d F t u f F m u i n t K n j t  
 f m D t V l —O n 2 4 2 l l r t o l l f r y h l r u k  
 l o h g h k e e l y p o r t o n f l a u s t g p u l l y r e l g h e e l  
 ( l H l o u g h m m e d l t t h N r t h m H o s p t l  
 H h l p o c l j l l e d l l l l o u h m l l l f h h g h

internal subcutaneous surface of the tibia and so long that very little extension of it at both ends was necessary to permit the open method with plate and screw fixation to be employed. In a similar case in the future the writer believes he would employ the closed method as in Case III and IV and close the wound by suture after the reduction and fixation. Except for the slow healing of the superficial wound the results in this case were as good as in any of the above four leg cases.

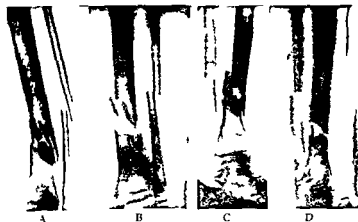


Fig. 393—Case IV. A case of severe laceration of the lower leg and ankle.

A. Before operation.  
B. After operation.

As between the open and closed method in compound fractures of the femur employed in Cases VI and VII the writer would be inclined to use the open method in fracture of the shaft without troublesome comminution as in Case VII but the closed method as in Case VI where there is much comminution especially near the joints. Hard and fast rules however should not be laid down.

Case V—Compound comminuted fracture of the lower leg and ankle-joint. Gangrene. —O 4/30/23. Two types of treatment. The first type of treatment consisted of the open method with plate and screw fixation. The second type of treatment consisted of the closed method with suture of the wound after reduction and fixation. The results in both cases were good.

llf gm t be gh ll to w th lw th pe os m l th lh t su  
 f g t th g l f m f th f m S t ct w  
 ffl lly th t t ca t ll h th ry m mall f gm ta  
 f semll ce f th mal f m d t m d by th palpat g  
 f ge

Aft ll g th h l t f th l h l hl m T  
 th t n g f th q d ps scl pp m t ll h m  
 tg t l th k ly lk mgut mll t l cept f pe fic ld  
 g t l ll l t f th d od sd l t th leut eo  
 t es M h l l g l g ll d g t th l Apl t  
 ct f th ll dl p t f tl t t ca l d th  
 h l l ml pt l ctly th l Th se d t l ce d  
 ted lly th h tt g f th bo l th so ld co l t bo t th w l  
 f m l th t se feet ll f ll

2/6 M h oo g t l g h l m l N local  
 t t l g f f e D g t be m l 2/8 R l g  
 M h l scl g f se sa g ou fl l N l f f t on 2/13  
 R l g A few loose pece f bon escaped f m th w l A mea f  
 tl ll l l scl g h l m y pel m ph l ll th f  
 l t h ptoce N l l gn f f t 2/18 Th

l g th w l j t bo l gl l sch g g f eely p l t  
 ul l t th h l ce f feet Sk t m d  
 3/6 C t m l l y t k tod l l som h t m g l t n  
 th m l ly ft ppl f cat N t h t t ct  
 f m but fl t l t l t lett l g m t ff gm t d th  
 f g l l l h t ry l m t l l t t h l l led  
 l 5/15 D sch g l t hes th pe

R l tt 12/8 25 A l pe l t l g pe g h d j l be  
 l t l f popl l f ce N 5 hl g t l l  
 m l l h l l h pe g l l g t on l bl  
 y h h tt l l l lly be l g 5/10 29  
 H bee l g l k h f j d f m th  
 All l scl g f th l sed l h y g bo l  
 h lly f l cl Now h l y kylos f th k se th  
 t kl l (F g 309) l l l l g f th f f cted l ml

C VII C mpo d F tur f F mur Plat d—( ) 4 3 29 f y  
 y l l t l re h l k g h h l l f h p tru k bo h  
 kl l ll ly g up f teel l g g h t lly f  
 l k Th l l t l h tl k 16 l y 10 feet l l g 10 f  
 th l g l ou l k h f e h m h g leg t ce l h  
 l wgt h N h Hosp l H l h 102 l t ted  
 f l lly l k l h l l l l h p l l ht h g  
 led l W l l l g hosp l  
 O l f se f h ght th gh bou 4 l es bo e h p t ll  
 t se w l l l h l g l l g f m med ll l ou y  
 h ll ll l h h g l h l gh h pl l f ed ed  
 k gk g h l l ced l h ll f m h edg f f h

h k g t se d d rw m h sol d by d t d blood  
 Th I th t o l pe f th l mb begi g bo  
 th pat ll d t d g bl q ly f m bo t 3 h t th d f  
 l d d t d bo 5 h It t d d th gh th q d p  
 t so m sci d l m mb f l pe g th k j t th  
 j t f f th f m be g feely po-ed t  
 A rubl t be t m q t ppl d d ctly t th k bo th l h  
 f dy t ll d l bl h m h g h h h d t d  
 f th pat t t k t th pe t g oom Aft h d bea w



Fig 399—C se VI Compo d comm ed f f gh f m  
 k ee j t f m d l h g d p se fi d  
 f th ft th d t

g th ct f gree soap d h d g k h l mb  
 d pcd th te l h t d l Th k h d fi h t  
 d h abbed th t f od f ll d b l h l d m l  
 ppl ed Th t f th d th h ghf l be l rvw re  
 by l d l h l l d g th k j t f l d be h d  
 Th t f h d d k ee j h pl d by h fi g  
 f ld h l ma g f h l being gl d  
 Th gh h l g d h h pe d p h k j l l l pe t  
 d palpat n d t th t h ppe rs th gl l f g  
 ment (F 399) had bee ru h d b k p ma ll f gm t  
 Th g l y film d d h d h g l h m

Id r g th t l heet dt l mallg pad gr ped al g  
 for ps d t w th od w pu h d th gh th m ll d th f  
 h h sed r lly t l t h d th f ct h tw ry pac  
 Th tru f ll mpo d f ct t t d by th t by th m thod  
 i le t pla l by th sepa t f th f gm t f ll g th f  
 t th t m k g gr d lly m ll d t p p o a hed l  
 f t f th k Th t f th w l l l e d a th ghly  
 f s bl f t w th od d th h l l l A g- h th  
 t ve th fract t t t ll post ly Bleed g po t  
 t ll d Wh l d ga sw b l w th od d alcoh l d th  
 f gm t app mat l d f l w th la pl t l ght sc h h  
 f sed lmost m pl t ly th gh both ly f compact bo (F g 400)  
 W f l o s e d by co t catgut t f th f sc l t d t rrup d  
 lk m gut f th k N d g l l t ca t f m h t t d  
 l l g th foot  
 4/13 C l t ce pe t h bee ry sat f t y H l t  
 t t pose l h h look l y good cept th t th  
 l l l t f th k l m h th d f l p sed th gh  
 f g th ppe dl p t f th d N d f feet  
 W l h d th l h l p t d w th od d co x d th t l  
 g m t d t l coh l db d g D g h ged ry f w l  
 th d sch ge l g 4/24 Uppe pe g ppa tly l o s e d l  
 pe g l sch g g all q t ty f p 5/30 Dry cal co w l  
 l l a c l g C t l l d d t l h l g d sc l  
 6/6 M m t f f gme t h h t fra t l d l e l  
 on New ca t p p l l l l g pel t kl 6/8 O t f bed  
 rut l t/15 D h ged 8/19/29 C t tll W f t l h l l

This is the first experience the writer can recall in which  
 plate and crews in a discharging wound were healed over  
 apparently permanently. In a compound fracture of the leg till  
 under treatment a crew which could not be removed without  
 chafing around it was left in and became healed over appar-  
 ently without continued discharge from around it.

C VIII.—Op R d t f M tata l Fra tu by In Thr gh  
 Ab ded d D tal d Sk n. Th se l l l h l ca se f h  
 l l l ge f f x t d l pera p ball gr h  
 f m h l ry l compo l g f ( ) 10 2 22 thrt thee  
 y o l l ed h t h ooden be m f ll h d r s m f h gh  
 foot H l gl mmed ly h N rth m Hos t l h  
 t ed f f th l se f th f t l acco l m t t sal t  
 th k l l p l ce x t f th f gm Th l so l t res  
 th h f f h h d d f th me l be es l d p l cem t Th  
 f ll ed m ked ll g f h foot h m l g l l l f  
 l h ll a l l l f t l f ct l f m es po po l



heavy g gpl t Th bon p trud g f mth d h h  
 spect d f mm ca g th th f t b l bo t d t  
 Th lmb l h h t th th l ft



Fig 400 -C VII C 100 lf t f ght f m Op l t lf t lyp t l

Ope t 4/3/29 Aft l g f th lmb h gree soap d t  
 dry g h g th th pa g h f d f ll db l h



f ght d j fte th d t It th l d d th t t th l ed  
 m thod ct fth d pl cem t mpo bl j h t d ct  
 h ppl d f t m t lt  
 Ope 11/4/2 Th k<sub>1</sub> f h bl b t y th d  
 f th foo d th pl t rf ce d sel g th d m a d  
 f ce t l th ! d p fi l bl k th t d m  
 d cat g pe fi l d l zat f th t es Th k<sub>2</sub> er g f h  
 bl bs fi t hed y th ga pad t w th th th ruf g  
 ca goo g f lloo] most f th d m f th foo Th h l foot  
 d l l k th p d h t ct f od d h d hed



A



B

Fig 401—C se VIII S pl f t f fi t se d h d d fi b  
 m ta sal bo Ope ! t b h gh b l l d d  
 t d k A B f d B f d

ff h l h l h h foo lraped h t nl hee d l  
 A bo j h l g m d h d m f h f t th  
 fi t m t sal f h gh h b d f k d h k ed matos  
 ts h gh h h h f t es f h fi d se d m ta sal  
 p j l h f g ip t d b h d f h el Th  
 d h lbed h d hl m T d l sed b hrom gu  
 h l A l l g d pl ca f th foo  
 ll g ipl d  
 Th k h f ll g d h d good d ct (fig 401)  
 10 31 B ca se f m port f h dg f h t r m d

po g m bl k d k f th m g l t g  
 b t t T d y ft p t th wh l d m fth catw m d  
 l g m bl k ec g d g l t g f b t th pe t  
 w d h d d f f f ct Dsch g d 12/5 th t t  
 t f d g C t m d fi lly w k ft pe t 12/29  
 H w lk g rut h w th f t h l g th m l f m th k  
 h d d m t t d t l l h g d bl l t H  
 d sed t t k ght th foot

C IX—C mp d P t D l t f Rght A kl w th P  
 t Margu l F tur f T b F t f Int rn l M l l nd f  
 Mddl Thurd f F b l —O 4/13/23 t ty th y ld m f l l f m  
 h se h foot bec m g ca ght th t rup d th h se f l l g H  
 b ght m m d t ly t th N th t H p t l O xam t t  
 l th h d p t d l at f th ght kl j t d th  
 w d th k t ly j t bo th kl Fl f f th w d  
 d th d g k f sed th d t b d th d d  
 l h l t l g d g ppl d th l g be g pl d f t bo  
 A y h d pot d l t d pot m g l f t f th  
 t b d f t f th t l m l l

I ed t 4/14 U d th th f t w l sed d va d It  
 seem d d t th t th t k w d mad th d l cat d kl  
 f ct mpo d Aft t l g th f l d f p t d th t f  
 th d w h t t f d d l h l th p d g se d  
 d p g th f l d w t l t l l t d t l t bse d th t th j t  
 ry f l d th t t w pec lly d f l t t th d pl t  
 Th d locat d d by p l l g th foot t gl d d d  
 fl g t po f lly f rw d Aft d g d b d g g h d th  
 d t m t d by fi g th foot f d fl 4/11 Ray  
 h w y m h b t t t f t ry d t l th f t d l cat  
 t compo d f h h th te h d t t i f l y l g mbe h g  
 lly mpl h d good d ct f th l t l d f m ty f h h th  
 p t cally l y som b t q t sat f t ry d t f th pot  
 d pl m t l l h p ced g se h w ll w d d t l h h  
 g sat f t y lt Th p t t bsol tly f sel se d t l d  
 ga t ll d ce t d be g d scha g d wh h d 4/13 th  
 t be g d t bed H f l l d ft rw d d h d f ct

C X.—C mp d F tu f B th F rm B —O 10/22/23  
 t ty se y ld dy h d h h d ca ght m h dd b k  
 d l g haft b k g th d d l bo t th mddl  
 Th f gm t gult g f rw d p od d mpo d f t f both  
 bo ly H dm tt d t th N rth t H p l l t th  
 ft th w k bo t s d th p t beg bo t  
 9 m W th th t h mpl y d th p d g se th d l f t  
 pl t d h gh po Th d f sed th t  
 d g h t mpo d g d t be g d H l g  
 t f l d h p t t d scl g d 10/29/23

C XL.—Compound F c t r f th Hume l Shaft Fix d by T t n.  
 —A ma fifty ld 4/6/9 f l l f m l d d j g h l f t  
 m H t k m m d t l t th \ h a t m H p t a l Th  
 f ly b l d g b l q d b o t l h l g th t f f  
 th m j t b o t m d d l Th p p e f g m t f f c t u d h m r u  
 p d d th g h th d H t k t th p e t g o o m b o t  
 h f t d m th l h g d p l m r v l g p a t



Fig 40 —Case N I C mpo d f f h m r u R d t b t t  
 A B f d B d C t d f f f f

b th ct f o d d co g h t l g h l h l d  
 b a d g e l th p e t g o o m th r r d g k h d h green  
 soap d t d p a t d h o d d l h l d th f i l d d p e f h  
 l h e e d t l Th f h d th abbed th  
 g h l h th o d d l h l l h l l g d g h m  
 d r y g a d b d g p p l d d h f f i d b j t c t  
 p l t h th m t th d  
 \ f o c c d d 4 l h pat f a c h g d f m h  
 h p t l O 5/11 th p l w m d p e m a f h d b e g  
 h l d d co d b s c b d h f t e d

C XL.—Compound P t D l t f E l b w j i n t.—O 11 3/23  
 g f t r y h d h d h l f m g h l g b e l b y h h  
 t c a r d d p l l e v c o m p o d p o d l c a f h l b o w  
 l g H b g h m m d l h \ r t h m H t l Th  
 f c e t d d l y t d g f m b o t h b h  
 t l d y l b o e h m d d l f h l b o j l y th  
 d g l g d l d h h l f h r t l p o c e s f h h m r u  
 p j c t g f m Th b r a h l c u m s c l th l  
 f t k d p p a f h h l d h f h s c l Th p a v e t

co ld m h f i g d h d d t g t h t t h m d r v w p b b l y  
t e t d t h r y l t t l h m h g t h m p o t t s e l w  
p b b l y j d l s o

P t t t k t p e t g m r y s o f t d m U d t h  
t h m d f m w f i t l s e d t h t t f g r e e s o a p d t  
d d d T h f i l d f p e t w t h d f c t d w t h t t f d  
f i l d b y l h l d d p d w t h t l h t d t w l T h t  
f t h w h l w d l d g t h l b w j t t h b b d t t h g h l y  
t h t h s a m f i d T h g l d 3 4 h l g l g d  
p w d d d w d t l t 8 9 h l g S t l t l w  
l m p e d t t h m a g d t h t p l d b y t t d f i g  
T h b p m l d t l p t h b p t l f s c w t e t  
l l t h m p o r t t s e l d r v l l f w h h w t h d  
f t h d T h m s c l p l l d t b e e b t w p o d l y  
d s e t d f d t t

T h d l o c t d d b t l d b k p t d d l y b y t  
f l f t h l b o w A f t t g t h t m a g f t h b h l t  
b y h m c a t g u t t m t t h d t t m a l l i g i t d l  
w m a d t t h j t p t l y h d f d l t t h  
l f d p e d t d g B t h l d l s e l y b y f t k  
m g u t t b e t h h l f t g h p e s t p e m t y  
j t d d f l d t c a p e A f t w b b g t h t w d t h  
d b l m T t w l d w t h h m c a t g u t t f t h k S t l  
l h l g d g d b d g p p l d d c u t f l u f t h  
l t w m t d b d h e s t p d t h w t d m 11/6 F  
d h g f b l o d y r u m D g m d d w d p s e d N  
d f f t R d g 11/13 D h d f m h p t l t h  
l b t l l t f l N d f f t f w d b t m l l  
f g l t t t 12/27 H b e l w l y g g m t  
F l u m l t b t 130 d g r N m a l p t d  
p t

C XIII.—C m p o u n d C m m i n u t d F t u r f H u m r u t E l b w  
j u n t O p t n d C l u r f W u n d W t h t D m g F D y A f t  
A d t.—A h l t h y h o o l g l t h r t y l d 8/0/22 t h  
f m h F l y l l M d j g h l f t l b o w h h b l d f e e l y  
H m h f f h l e v f h d t t q t p t h  
b l d g f m d b t 2 h l g p o t t l l b o t 2 h  
b t h l b j t S h p f b p t r u d g h t  
t h g h t h w d H l f h l a p h y d d t h d d  
t p r i d h p a t t h t m b l h p t l g h b o g t  
h g d g l t h d d t h p t d g f g m  
p m l l g d t h w d d d t d p p l d t g h t g l d  
w l k d p l t  
O h f l l g d y h t d t h h m P h l d l p h d  
c a m l h c a f h p h D G V J O t h f l l g  
d y k h h l d b s e l t h t d y T h  
d h d m t d h H d H p t l P h l d l p h b o t 3

Th wr saw h fi lo t 8 30 p m Th pl h h th ka  
graph fea ed t mo e mad th fi y sat f ct ry New ones



Fig 403—C se \III C mg l comm ed f ru fl d f  
l f h m rus. Ope ed ctio l fixa b d l A d C Bef re  
ed ctio B d D Af ed ct E and f f h ovr ph fl mb se e  
y f h cc d E Sh f ea m d p F  
f d sup

ke on th fl g day d ead f pect h f  
oon (Fig 403 A l C) A l fi ph ct f xam h d

mph d th se p g It w fi d y 8/25/22 whe  
 th pe t w p f m d th w d h d b h dl d by t lea t th  
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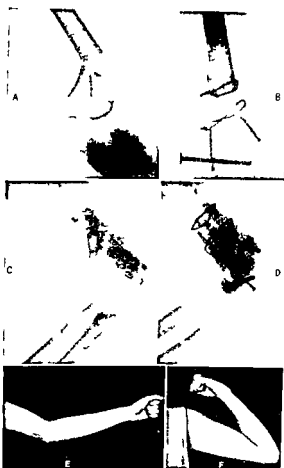


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## CLINIC OF DR CHARLES C NORRIS

HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA

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### FACTORS INFLUENCING GYNECOLOGIC MORTALITY AND MORBIDITY

WITH AN ANALYSIS OF THE RESULTS OBTAINED IN 4212 CASES  
OPERATED UPON IN THE JOHN GOODRICH CLARK GYNECO  
LOGICAL CLINIC

TRAVELING and seeing the work of other surgeons attendance upon staff and medical meetings recognition of the importance of follow up and other factors which afford a comparison of results have all tended toward an improvement and standardization of surgical method and while these methods always will differ in minor detail the general principles are becoming more or less uniform Individual judgment and operative ability are two factors of vital importance for the welfare of the patient which can never be entirely standardized The former has a particularly definite bearing upon the mortality rate

Given sufficient practice almost any one can train himself to a certain degree of manual dexterity but really good surgical judgment is much more difficult to develop Spectators will always admire the former and in certain desperate cases it may be the deciding factor between life and death Speed is desirable but endeavor to operate with great rapidity has probably killed more patients than it has saved Dilatory method on the other hand are inexcusable With modern technic and skilfully administered anesthesia however the saving of a few minutes on the operating table is less important than the careful and conscientious performance of the operation Furthermore it certainly is of far less importance than the surgical judgment which based upon the history and other circumstances surrounding the individual case decides whether to



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operate at all and if operation is decided upon what operation to perform

Gynecological patients who require surgical intervention may be divided into three groups namely (a) Good risks (b) moderately good risks and (c) bad risks. It is among the latter two groups and especially in the really bad risks that surgical judgment is of such vital importance. Periodic surgical audits based upon mortality, morbidity and follow up results constitute an integral part of every modern surgical clinic. It is only by a rigidly unbiased study of these results that we can hope to improve upon the general standard of our work. One of the difficulties with such audits is that they often are conducted by the head of the clinic and the one who probably performs the majority of the operations. Under even the most favorable circumstance this tends to check free discussion of many cases. If it were possible to discuss fatal cases at staff meetings without the audience being cognizant of the identity of the surgeon responsible in each case a more free and unhampered discussion of the merit of the employed treatment would be possible. In all events at staff meetings a rigid analysis of all cases brought for discussion is essential if the best results are to be secured.

By careful selection of cases the young surgeon may be able to complete a long series of operations without mortality. The responsibilities of the operator are however fully realized only after the rigid self-analysis which follows an unexpected operative death. Even if every possible safeguarding measure has been taken this self-analysis is very painful and although a strict review of the case shows that nothing has been omitted or committed which calls for the slightest criticism the conscientious surgeon is prone to question his judgment. Occasional operative deaths are certain to occur but secure self-analysis and critical study of all these are by a high majority of the staff are not only proper but are beneficial to the general character of subsequent work even further safeguard for future patients. That some particular operative death was unavoidable and nobody's fault may be true but this is an

underrable viewpoint to assume and as a matter of fact generally an incorrect one

## MORTALITY

Total	4212
Number of patients	24 (0.57 per cent)
Cause of Death	
Infant	5
{ Preterm	3
{ Septicemia	1
{ Placental	1
Embryonic	3
{ Dead at birth	3
{ Stillborn	2
Uterine	3
Slipped ligament	1
Tubal	1
Acute pelvic inflammatory disease	1
Infant	1
Total	24

## O R R

Cause of Death	Good Luck	Modest Luck	Bad Luck
Infant	2	1	1
{ Preterm	1	1	1
{ Septicemia			
{ Placental			
Embryonic	1	2	
{ Dead at birth		3	
{ Stillborn		2	
Uterine		1	
Slipped ligament			1
Tubal			1
Acute pelvic inflammatory disease		1	
Infant			1
Total	4	11	9

The foregoing is an analysis of the mortality and morbidity observed in the John Goodrich Clark Gynecological Clinic at the Hospital of the University of Pennsylvania during the last seven years.

What constitute the good and bad risks is easy to define. Among the moderate risks have been placed all patients suffering from complication such as renal, pulmonary, hepatic or cardiac disease but in good general condition, also patients suffering from moderate grades of anemia, those in whom the operative difficulties were extreme and all others who although in fairly good general health showed some defect detrimental to the safety of the operation. It goes without saying that the more the operative risk, the more definite should the indications for operation be. A woman with a moderate degree of laceration of the pelvic floor should properly be advised to submit to a perineorrhaphy if she is a good operative risk, as the comfort gained would be well worth the almost negligible risk incurred by the operation. If on the other hand the woman suffered from a pulmonary tuberculosis or from a cardiac lesion with decompensation, such advice would obviously be unwaranted.

Certain lesions, e. g., carcinoma, may be almost symptomless in the early stage but must be treated with promptness if a cure is to be secured. The same goes with such acute conditions as torsion of the pedicle of an ovarian neoplasm, ruptured ectopic pregnancy, and diseases complicated by severe anemia or associated diseases of grave nature constitute the bulk of the bad operative risk.

Many gynecologic lesions are not in themselves fatal and the operative risk and likelihood of permanent relief of symptom should be carefully considered before deciding whether to operate or not. One of the advantages of accurate follow-up studies is that they enable the surgeon to determine with almost mathematical exactness the chance of relief that he can offer the individual patient.

Many gynecologic lesions may be treated palliatively with complete success. In other cases comfort to the patient may be

secured although a cure may not be effected. With some enthusiastic surgeons the use of the *pes ary* is a lost art. With the improvement in operative technic and the lowering of operative mortality the field of operative treatment has widened. No operation however is so trivial that every step to safeguard the patient should not be employed nor is any operation entirely free from the danger of a fatal termination. Major risks have to be taken but every effort should be made to minimize them by preoperative study and care and operative judgment and technic should be exercised to the utmost.

About 75 per cent of our operative cases are classed as good risks, 20 per cent as moderate risks and the remaining 5 per cent as bad risks. Thus of the 4212 cases under analysis 3160 were good risks. Among them 4 deaths occurred giving a mortality rate of 0.1 per cent. Eight hundred and forty-two cases were moderate risks with 11 deaths or a mortality rate of 1.3 per cent. Among the 210 bad risks there were 9 deaths or a mortality rate of 4.3 per cent.

An analysis of our chart on mortality (p. 1097) shows that in 9 cases (37.5 per cent of all deaths) the fatality was due to infection. Six of the 9 patients in question were of the septic class prior to operation but the remaining 3 were so called clean cases and the deaths were probably caused by some faulty operative technic. In one of these last cases an extensive plastic operation was performed and the source of infection was probably the operator's throat. This happened prior to the adoption of our present technic which requires all personnel on the operating room floor to wear masks even for plastic operations.

The 3 deaths from emboli all followed major operations and in each case careful preoperative studies had been made. The 3 cardiac deaths all occurred following imperative operation upon patients who had been given careful preliminary treatment. One of these patients suffered from a grave aortic lesion but in the remaining two the heart was normal. Two of these patients suffered from carcinoma and the third from a large myoma. Uremia accounted for 3 deaths occurring in



patients requiring major operations for carcinoma. In one of the 6 cases the urine contained albumin and casts prior to operation while in the other two the urine and blood pressure were normal. The small incidence (2 cases) of death due to pulmonary complications is an indication of careful preoperative care and well administered anesthesia.

The following is a summary of the postoperative complications which have been encountered in the present series of cases.

	Operations	Deaths
Vaginal	2439	8 (0.32 per cent) (304 patients)
Abdominal	1345	12 (0.89 per cent) (112 patients)
Combined vaginal and abdominal	428	4 (0.93 per cent) (107 patients)
Total	421	24

In our clinic combined vaginal and abdominal operations are routinely performed when indicated provided the patient's condition permits. No hard and fast rule is adopted; the decision rests entirely upon the surgeon's judgment. My personal opinion in this respect is that it is best to err on the side of safety. As a matter of fact with careful preoperative care and properly administered anesthesia combined operation can generally be performed with safety. Safety is the vital factor but on the other hand many patients require both vaginal and abdominal operation to effect a cure. A two-stage operation has many drawbacks and carries a double risk although a certain operative hazard is concerned. Two-stage operations are however often necessary in cases of pelvic abscess the primary operation being a vaginal incision and evacuation of pus. In some of these instances a complete reposition from above may be necessary at a late date to secure relief from symptoms. The operations for laceration of the vagina and for retroversion can almost routinely be combined. In the latter of cases the patient is usually in good condition and whether the abdominal or the plastic operation is successful also. Two-stage operations are extremely trying to the patient and to

therefore far preferable from every point of view to complete the work at one sitting when this is compatible with safety. As may be seen from the table on page 1100 our combined operations have given practically the same mortality rate as that of uncomplicated laparotomies.

In a recent study Polak and Tallef on have shown that in their hands the routine removal of the appendix is inadvisable. Although routine appendectomy theoretically should result in a greater number of operative complications we have not found this to be the case in practice in our clinic. Moreover it is difficult and impossible to estimate the benefits derived from this operation. In the series forming the basis of this study routine appendectomy was practised when the patient's general condition was good at the completion of the intra-abdominal work and when the operation presented no particular difficulties.

**Wound Infection.**—Among 1773 abdominal or combined vaginal and abdominal operation the following infections occurred:

C d A	106
G d B	6
C d C	1
<hr/>	
Total	113 ( 5 pe )

The severe grade of infection often come from within and less frequently from breaks in operative technic. Absolute hemostasis, the avoidance of unnecessary trauma and the use of steril antiseptics combined with the proper wound protection will prevent nearly all the minor grades of wound infection.

**Pelvic peritonitis.**—Pelvic peritonitis developed among 1773 laparotomies 19 times following operations for pelvic inflammatory disease 10 times following operations for myoma of the uterus once following operation for retrodisplacement of the uterus.

Operation during the acute stage of a pelvic peritonitis or in too short a time after an acute exacerbation is frequently the cause of these postoperative complications.

The following complications developed in the entire series (4212 cases)

Pelvic J O    1 T h f s o    D G Am J    O l t 9 c y    O t b    19 8



smaller caliber than called for accounts for a proportion of secondary hemorrhages. The suture nurse may readily make such a mistake which may be unlooked for by the operator.

Figures such as the above show little except the general trend of surgical results. Thus Polak and Tallefson record an operative mortality of 2.9 per cent (3125 operations with 95 deaths) and Peterson 16 deaths among 1734 operative cases a mortality of 0.58 per cent as compared with our own mortality rate of 0.57 per cent. Later or earlier studies from these clinics might readily transpose the figures. They do however demonstrate that in carefully conducted clinics the mortality rate is small and an analysis of our own cases demonstrate that it should be still further reduced.

As previously stated 37.5 per cent of our deaths were due to infection. Operating too early after an acute attack of pelvic inflammatory disease undoubtedly accounted for some of these fatalities.

An analytical review such as is here attempted must necessarily be incomplete. It is probably always of more interest and benefit to the surgeon who makes the review than to the reader. The essayist can do little more than suggest points which in his experience are of importance and tend to improve results. Most of these are well recognized and do not require to be stressed. Details of technic which require adjustment in the writer's service may be well nigh perfect in many other clinics. It is not however trespassing to state that some hospitals require a careful check up on their surgical results. This can be attained in part at least by an unbiased periodic audit of the mortality rate in the various services.

Certainly of equal if not of greater value is a check up upon end results. Without this we are working in the dark as far as the relative merits of different forms of treatment for the various malignant neoplasms are concerned. It also offers a partial check up on the reliability of the work of the pathologist.

<i>Phil</i>	31	8 case	0.66 per cent
<i>B</i>	h po pe t	16 case	0.33
<i>Pl</i>	f l g pe t f		
<i>V</i>			
<i>E tra t</i>	e p g r		
<i>Ovar</i>	eo pl m	4	
<i>I</i>	pl hort	1	
<i>Pl</i>	pe t	1	
<i>I l</i>	fl m r d se se		
<i>R</i>	e io f th t ru	1	
<i>P</i>	f l l w g per t on f		
<i>P l</i>	fl mm t r d se se	2	
<i>V</i>		0	
<i>E d m t m</i>		1	11 cases 0.6 per cent
<i>F</i>	t p egn y	1	
<i>R ctoc l</i>		1	
<i>A l p l m</i>	y ll p	3 cases	0.0 per cent
<i>I t st</i>	l b l l po t pe	case	0.04
<i>A t g t</i>	d l l on po pe	3 case	0.0
<i>H m</i>	h e po pe f m		
<i>Pl</i>	pe t po he cerv	10	
<i>Pl</i>	pe po h pe	4	15 case 0.3 per cent
<i>Slipped l g</i>	f m u u se l	1	

A careful preliminary study and properly administered anesthetic with ordinary efficient postoperative care should almost eliminate most of the postoperative pulmonary complication.

<i>Cy l l</i>	pos pera	case	0.66 per cent
<i>P y l l</i>		1 case	0.49
<i>D th</i>		4 case	0.5

Primary hemorrhage is an inexcusable postoperative complication and generally the result of carelessness or haste or both. Double ligature with triple tied knots upon all main vessel will prevent the more serious forms of this accident. Our clinic opinion following placental operation upon the cervix has been about two and a half times as frequent as from operations upon the vagina. Secondary hemorrhage due to premature absorption of catgut or defective ligation of small vessels but is a rare complication in these days of excellent commercial prepared catgut. The occasional inadvertence of cutting of

he may gain experience. In no case is such a practice justifiable without the constant supervision of an experienced anesthetist and is not as a rule to the best interest of the patient or surgeon even with such supervision.

There are many contraindications relative to general anesthesia. The presence of a slight cough or cold is one of the most important. The strict attention paid to such complications in all elective work accounts I believe for the relative absence of pulmonary complications in the present series. Of all anesthetics ether is especially prone to produce an exacerbation in these cases and even if no actually alarming postoperative symptoms develop extreme discomfort to the patient is prone to result.

**Operative Technique**—Wound protection preferably by rubber dam as practised by N. S. Heaney of Chicago combined with careful hemostasis and gentleness in the handling of tissues is important to the careful surgeon. Complete peritonization is of vital importance for the prevention of adhesions and for the subsequent comfort of the patient. As suggested by the late John G. Clark the routine administration per rectum of 1000 cc of water at the completion of a plastic or especially an abdominal operation is a valuable procedure. To the enema may well be added glucose as suggested by George Gray Ward of New York. Such an enema rearrange coils of intestine which may have been displaced during operation, supplies liquid and applies heat over the viscera. Prior to the administration of the anesthetic a rectal tube is inserted and held in place by adhesive plaster. The enema is given while the abdominal wound is being closed or immediately following the completion of the operation. While it is being given the patient should be in the Trendelenburg position. Patients so treated suffer less than others from postoperative thirst and eliminate more urine during the first twenty-four hours after operation.

### CONCLUSIONS

1. Preoperative study and care are of the utmost importance but are impossible when a patient is operated upon within

The histologic diagnosis of gynecologic specimens is by no means satisfactorily performed in many hospitals. Of very great importance is the follow up in its relation to relief of symptoms. No business could be conducted today without a periodic audit and this is what the follow up constitute for surgical work. The majority of gynecologic operations are not lifesaving but are performed in order to give the patient relief from painful symptom. The choice of the operation depend upon the surgeon and how can he be expected to make a correct estimate of the value of his work unless he is aware of the end result. This follow up is expensive in that it requires special clerks and adequately trained follow up field worker. It is however essential for the best interest of the hospital, the patient and the surgeon. The writing of cured upon the discharge card by no means end the responsibility of the surgeon or the hospital. This is especially true in regard to gynecologic patient. That a satisfactory anatomic result is recorded often by an assistant or intern is no proof that the patient has been relieved from the symptom which were present prior to the operation.

**Preoperative Study**—No case is too trivial to require a thorough preoperative study. When operation has been decided upon the patient generally will have the right to live with as short a preoperative stay in the hospital as possible. It is impossible to safeguard the patient who comes to the hospital on the day prior to the operation. Forty eight hour preoperative stay in the hospital is imperative and in many cases a longer period is necessary. The foregoing apply to emergency work which however fortunately is infrequently frequent in gynecologic practice.

**Anesthesia**—Probably of the anesthetist is of great importance than is the hospital method of anesthesia. Neither safe nor satisfactory anesthesia can be expected if the administration is entrusted to an intern whose term of service is limited and whose interest often centers in the operation instead of on the anesthesia. It may be necessary in many hospitals to allow an intern to do the same thing that a major performs so that

## CLINIC OF DRS JOHN BERTON CARNETT AND EUGENE A CASE

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### A CLINICAL AND PATHOLOGICAL DISCUSSION OF SO CALLED SUBACROMIAL BURSITIS

I HAVE invited several patients to meet you today who exhibit various phases of the affection commonly called subacromial bursitis. In a paper written in 1924 and published in Surgery Gynecology and Obstetrics in October 1925 I gave the data on 44 cases of so called subacromial bursitis with calcareous deposits in 19 of which I had the opportunity to examine the lesions at open operation. Since then my experience has more than doubled both with operative and non-operative cases. I have also studied numerous cases of the symptom complex known as bursitis but in which no calcareous deposit could be demonstrated by skiagrams.

Whether calcareous deposits are present or not the clinical picture of the disease is quite similar although the non calcareous cases are usually milder hence the underlying lesion is presumably the same. Frank suppuration sometimes occurs within the subacromial bursa but we are not considering that type of lesion today. I am convinced that toxemia is not a factor of any moment in producing the lesion in the cases I have seen. I am not in sympathy with the generally accepted view that bursitis is practically always due to an external or internal single acute trauma with injury to the bursa resulting either directly as by a blow or violent pinching between the acromion process and greater humeral tuberosity or indirectly by rupture of some of the fibers of the underlying supraspinatus tendon. In the great majority of my own cases and of the cases reported by several writers there was entire absence of any trauma adequate



twenty-four hours of admission to the hospital. For obvious reasons, bad surgical risks are less likely to be neglected in this respect than are patients who are apparently in good physical condition.

2. Transfusion should be employed routinely in anemic patients in both the pre- and post-operative state.

3. Slight cough and cold are absolute contraindications to elective operations which are to be performed under a general anesthetic.

4. A competent anesthesiologist is an essential. Anesthesia by intern is usually unsafe and un satisfactory.

5. Operative technique

(a) Wound protection and absolute hemostasis are essential for the successful healing of abdominal wound.

(b) All personnel on the operating room floor should be masked. The masks should cover both nose and mouth.

(c) A rigid check on aseptic technique should be constantly in force. New assistant and nurses should be especially instructed in this respect and carefully checked up upon.

6. Despite the many valuable contributions to the subject, patients with pelvic inflammatory disease are still being operated upon too often and too early in many clinics.

An efficient follow-up department is of vital importance to every gynecologic clinic. Discharge from the hospital by no means ends the responsibility of the surgeon or institution. Without a follow-up it is impossible to judge results, and it is only by a study of results that future patients can be benefited by past experience. Many hospital and busy surgeons do not realize the importance of this point.

Th se db sa se w th t d po t wh m l p c t d l d  
m h lpped g g d w at d t h l f m f l l g  
th h ght h d p l tw d db k d w th th p l m g t  
th lt Th h l t h b g h g pa t th p t f th  
ght l ld b t d d t c lt phy f th d y A f lty k  
gr m th l d t m k d g os f d l cat f th b ld d h  
f d t m f d t lt b h d d t h d l  
cat d th p w fi d by th k g m Th pat t  
h d q t p l m t d t th p p e d l t d g Th t p e t f  
th gl t h ld b l g d p m tly d d l t l Fl ct t  
ly d m t bl b th th l l t d Sh b l t ly f sed t t  
t mpt y et h ld m t d t d ff t t t t f p  
m t n l p e t d h h d pt f th p p t t d  
I p e t d th fifth d y ft h l t O p t g th d l t d  
fibe th t se b s h d t self f r d t th d d sembl d  
; t d p m O g th b l g q t ty f l ghtly  
blood i g d fi l ped B sal ll t t d f mly  
g t d sof th ld be p e t d C f l sca h l d g p l t  
t g f t l h l fi f l d t d l y t tl p p tu t d  
I b sa w l ft pe bbe t be d t d d th  
d l t d d k w t d Sh h d m m d t l f f p d h  
l l ft th h p t l th th d y l m t t f m t ma ly  
th d ct f b d t Sh oo g d f l l g f m t R ry  
ld p b bly h be p mpt w th gl p e t l p t I  
h t t d y m l ca Th m th be 3 4  
f l l h b sa b t l h t sc d m y th p e t  
case l th gh th t p t t f q t cu l fy g b  
t

In approximately 50 cases of calcareous deposits in which I have seen the subacromial bursa exposed at operation I was not able to detect any pathologic changes in the bursa itself in the majority of instances. The one constant lesion in these cases is the calcareous deposit situated beneath the bursa on or under the suprapinatus tendon. There was no material difference in the clinical symptoms as between the cases in which the bursa was normal and those in which it showed slight redness in the region of the deposit of free or many adhesions.

I have removed sections of the bursa and of the tendon in many of these cases for microscopic study and Dr. Chase who is present will later describe to you the constant lesions he finds in the tendon and the infrequency of any abnormality in the bursa. I therefore believe that the symptoms commonly ascribed to bursitis are in reality due to a lesion of the supra





spinatus tendon irrespective of whether a calcareous deposit is present or not. I have never seen at operation any evidence of recently torn tendon fibers or blood clots as described by some writers and Dr. Case will tell you he had found slight traces of blood pigment in only 1 or 2 cases.

### ETIOLOGY

The common cause of this tendon lesion seems to be occupational traumata. It is seen most frequently in such individuals as typists, machine operators, pianists, chauffeurs, etc., who work with the right hand while their elbows are held away from the side of the chest. In this position the supraspinatus tendon is subjected to bruising or pinching trauma between the greater tuberosity and the acromion or the coracoacromial ligament.

Judging by the specimen removed at operation the repeated occupational traumata evoke an inflammation in the tendon with consequent disturbance of blood supply and necrosis of tendon tissue which may be followed by the deposition of calcium and other mineral salts. Clinical symptoms presumably may occur at any stage of this pathologic process. On the other hand there is ample evidence to prove that the entire process may progress to the extent of forming large deposits without giving rise to any clinical symptoms. I have seen 6 cases of bilateral calcareous deposits without symptoms discovered accidentally in skiagraphs. Curiously all 6 cases were noted in chest skiagram of patient having cancer of the breast. Within the past few days I have told of another accidentally discovered case of bilateral deposit in the skiagram of the chest of a patient having a cardiac lesion.

### SYMPTOMS

Subacromial bursitis particularly in its calcareous form is very rare before the thirtieth year of age. The symptoms of bursitis vary greatly in different patients in accordance with the severity and stage of the lesion which may be acute, subacute or chronic. The onset may be insidious but is often abrupt and viciously painful. Usually the history of shoulder trauma is obtainable. In a number of cases patient gives a

history of an automobile or other accident or unexpected strain involving the shoulder muscles

Cases of acute on et u ally pre ent symptom of pain in the distribution of the brachial plexus and marked limitation of shoulder movements. The pain may extend all the way from the neck to the fin er tips or may be restricted to an area in the arm or in the arm and forearm. Frequently the pain is most severe in the lower half of the deltoid region. Almost never do patients make any special complaint of the region immediately overlying the bursa. In the hyperacute ca e the pain is a onizing and require large doses of morphin for its control. Physician not famular with bursitis nearly always diagnose these cases as brachial neuritis and treat them in vain by tonsillectomies tooth extractions and other measures directed against possible toxic foci. The condition is not a true neuritis as reactions of de eneration do not occur. The preceding symptoms are those of brachial neuralgia and by far the most common cause of brachial neuralgia is subacromial bur iti. In brachial neuralgia from other causes it is very rare to find limitation of passive shoulder motion. In acute bursiti both active and passi e motions are greatly limited because of pain and muscle spasm. Restriction is mo t marked in abduction and inward rotation and is less in external rotation. Backward and forward swinging of the arm with the elbow flexed and close to the che t i the least restricted motion and is painlessly possible to a greater degree than in acute arthritis of the shoulder.

In bursitis both acute and chronic there will be found a sharply localized tender area never exceeding a quarter dollar in size situated immediately beneath the edge of the acromion process and anywhere along a line extending from the bicipital groove outward nearly to the external aspect of the humerus. Tenderness is most frequent in the region of the greater tuberosity. Skiagrams reveal the tender area coincides with the location of the calcareous deposit when the latter is present and presumably correspond with the tendon lesion in the absence of deposit. Many individuals with otherwise apparently normal shoulders have tenderne s usually much le marked than in bursitis.

over the greater tuberosity. Atrophy of the supraspinatus infraspinatus and deltoid muscles occurs early.

The majority of acute and hyperacute cases lose their severe pain in from three to five weeks and many then proceed to rapid and complete recovery but many of them pass over into a subacute or chronic form and have milder symptoms going on for months or year.

Subacute and chronic cases may begin as such without a primary acute attack. They may have symptoms quite similar to the acute but much milder in degree. Some of them however may experience pain only in certain motions of the shoulder particularly abduction.

Raising the arm outward and up and from the side is painless at the start but more or less severe pain is encountered while the arm is passing through that portion of the arc from 15 to 90 degrees and is again painless in passing from the 90 to 180-degree angle. Similar pain is experienced through the same arc in bringing the arm down again to the side of the chest. At the 15 to 90 degree angle the sensitive lesion whether in bursa or tendon is compressed between the tuberosity of the humerus and the acromion process. Above the 90 degree angle the lesion has passed under the clavicle and is free from pressure. Chronic cases are prone to have mild exacerbations and may at any time develop a very acute flareup. Many of the chronic cases have some restriction of shoulder movements due to habit contracture from prolonged disuse of the full range of motion during periods of severe pain.

Many writers who have not operated on the subacromial bursa describe adhesions within the bursa as the main cause of stiff shoulder joint and describe a clinical syndrome in which the bursa adhesions being broken up when the humerus is manipulated under an anesthetic.

I have counted adhesions of any moment in only one operative case of bursitis. That patient is here for your observation. He is a fellow physician anxious to get away and I will demonstrate their existence now. The first physician is the skierapher designated as Case III and skierapher of his

shoulder are shown in Fig 10 of my previous paper. He had several weeks of mild chronic symptoms in his left shoulder and then had an intermission with complete absence of all symptoms for a few days. In taking a bath one evening he was delighted to find he could use the see saw motion of the towel to dry his back without any pain or limitation of shoulder movement. Five hours later he was roused from sleep by vicious pain and all the symptoms of an acute attack of left subacromial bursitis. I operated the same day, January 16, 1923, removed a calcareous deposit and broke up extensive fibrous adhesions of at least three weeks' duration which had obliterated the bursa. Notwithstanding the extensive adhesions he had full free range of shoulder motion within sixteen hours before operation.

The most restricted motion in the shoulder that I have seen in any case of chronic bursitis is this second physician who is described as Case IV in my former paper. He had several months of chronic pain followed by an acute exacerbation and operation on December 31, 1920. His bursa was entirely free from any evidence of adhesions or of other pathology. A calcareous deposit was removed from his supraspinatus tendon. Before closing the incision I used great force in manipulating his arm with resulting snapping of adhesions. Had these manipulations been performed without opening the bursa many surgeons would unhesitatingly have described the case as one of intrabursal adhesions.

Other cases similar to the extensive adhesions in the bursa without restriction of the shoulder in the skiagrapher and the marked shoulder restriction without intrabursal adhesions in the general practitioner have made me very skeptical as to bursal adhesions being a common cause for stiffness of the shoulder. Brickner has described cases of bursal obliteration by adhesions without loss of abduction. In bursitis I believe the limitation of motion is due in the acute cases to muscle spasm and pain and in the chronic cases to contracture of all the soft tissues—with possibly some adhesions between them around the joint with prolonged maintenance of one position.



## DIAGNOSIS

The diagnosis of this affection as a rule is not difficult on history and physical examination. The distribution of pain, the characteristic limitation of shoulder motion and the sharply localized area of tenderness are fairly distinctive. Some bursitis cases resemble arthritis of the shoulder but in the latter tenderness is found around the entire circumference of the humeral head instead of being sharply localized at one spot anteriorly.

Skiaograms are very helpful not only in excluding other possible shoulder lesions but also by demonstrating a calcareous deposit when it is present.

Calcareous deposits are tricky lesions and the diagnostician must be aware of the peculiarities concerning which very little is contained in literature in order to avoid various possible errors. The shadow cast by the deposits are frequently obscured or totally lost in the overlying bone shadow in skiaograms as ordinarily taken of the shoulder joint. In the usual skiaogram there is an overlapping of the shadow of the humeral head and the acromion process at the area in which deposits are most commonly found. It is most important that these two shadows be separated from one another so that the deposit shadow stand out clearly between them. With the patient lying on his back with the film under his shoulder by directing the rays from above downward and from within outward rather than the usual direct from front backward a clear space will be shown between the head of the humerus and the acromion process.

Stereo-copic film made under these conditions affords the most reliable means of locating deposits and differentiating them from osteophytes from fracture of the tuberosity and from the occasional local bone condensation and other bone lesions found in the head of the humerus.

If stereoscopic film is not taken then it is imperative that skiaograms be taken both in extreme inward and in extreme outward rotation of the humerus. For the inward rotation view the hand of the flexed elbow rest on the patient's abdomen and for the external rotation view the elbow is flexed to a right angle and the hand turned away from the body till the back of

the hand rests on the table. The same positions of extreme inward and outward rotation of the humerus can be obtained with the elbow extended by forcible pronation and supination of the hand. In one view or the other the deposit shadow will be shown clear of the humerus shadow whereas in the opposite view the deposit shadow is frequently obscured or completely hidden by the humerus shadow.

A negative diagnosis of calcareous deposit should never be given unless all the preceding precautions have been carefully observed.

By determining the location of the area of localized tenderness it is possible to predict which view will show the deposit shadow. When the tenderness is at or near the greater tuberosity the deposit will be shown in the external rotation film and when the tenderness is near the outer margin of the shoulder the shadow will be shown best in internal rotation.

I have seen only one patient in whom excellent films were negative for deposits and who subsequently developed them. The skiagrams in her case were negative after one year of bilateral bursitis symptoms but were positive for both shoulders about eight months later. It is probable that similar cases might have been discovered had I resorted more frequently to follow up skiagram in case that were negative at the first examination. I have seen only 4 cases in which known deposits enlarged while under observation. One of them is shown by the skiagram of the right shoulder of the kinesiographer who had the extensive adhesions of his left bursa. The small deposits in his right shoulder were first discovered in January 1924 after the onset of mild symptoms. He has never had any severe pain in this shoulder otherwise he states he would have had it operated. He has recurrent mild attacks with entire freedom between attacks and has least trouble during the summer months. During the first eight months after their first discovery there was a gradual absorption of his small deposits. He took numerous diathermy treatments. Much to the surprise of both of us a recent picture taken before he came here today shows a large shadow a deposit in the film (Fig 404). I have seen one

other patient in whom the deposit definitely enlarged during a period of several weeks while the patient was undergoing active diathermy treatment.



Fig 404—A d po h h sed h l l t-erva

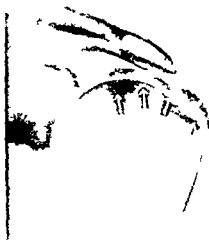


Fig 405—D pos gh h ld l l  
D po t d ll h gh l p A l cal  
yrupt

About one out of every three patients who complain of symptoms in one shoulder only are shown by skiagrams to have deposits in both shoulders. This patient has been having acute symptoms in his right shoulder for two weeks and has never had any trouble in his left shoulder. This film of his right shoulder (Fig. 405) shows a large deposit extending high up under the acromion suggesting that it may have ruptured into and diffused through the bursa but in another patient with an entirely similar skiagram I had great difficulty in removing the deposit from the tendon high up under the acromion. This film of



Fig. 406—D. p. t. l. f. h. l. l. S. l. w. b. t. t. l. rot. t. U.  
l. l. g. d. p. t. f. ympt. ml. l. l. d. S. m. p. t. t. Fig. 405

his left shoulder (Fig. 406) shows an unusually large deposit for a symptomless shoulder. The quiescent deposit may remain dormant for years or may give rise to symptoms at any time. An attack first in one shoulder and then in the opposite shoulder a year or more later is not unusual. Symptoms in both shoulders simultaneously are not very rare. I have mentioned one such case and will have another one here today. He is a newspaper editor who was hospitalized about four years ago with symptoms diagnosed as bilateral brachial neuritis. He

had tonsil and teeth removed without improvement. When he later came under my observation I sent him to the skiagrapher who was present today as a patient for examination of both shoulders. He reported both shoulders negative for deposits. This skiagrapher is particularly skilful in diagnosis but in this instance he failed to adjust the rays to separate the acromial and humeral shadows. I sent the patient back for further examination by correct technic and then large deposits were shown in both shoulders as evidenced by these diagrams. He has not had any bursitis symptoms for the past three years. He was rerayed three days ago and these recent pictures show deposits very much reduced in size in both shoulders.

I always have both shoulders examined by x-rays even though symptoms are present on one side only. In a case that I recall the skiagrams were negative in the shoulder presenting symptom and were positive in the quiescent shoulder. Each of the two patients had had prolonged symptoms with recent improvement and it is probable each of them had had a deposit that had undergone spontaneous absorption. We have one case of this type with us today. This bedfast patient is the mother of one of our interns. She was operated upon a week ago for a gynecologic condition. When she came to the hospital she gave a history of four months symptoms of bursitis in her left shoulder. As you will observe the excellent skiagrams show a large deposit in the symptomatic right shoulder and none in the left shoulder. Presumably she has had a deposit in her left shoulder which has absorbed spontaneously and she can look forward to complete disappearance of symptoms in the near future but she does run the risk of developing similar symptoms in her left shoulder and if there are a few more as those she has had in the right shoulder we shall discuss operation.

#### TREATMENT

Non-californian bursitis does not require operation. Its treatment is essentially the same as that of the non-operative cases of californian bursitis. The majority of us agree that the

on bursitis give preference to non operative treatment even in the calcareous cases and only resort to operation in cases in which symptoms have persisted for weeks or months under medical care

Codman who was the first to describe subacromial bursitis in 1906 and myself are inclined to be more liberal in advising operation as the simplest speediest and surest method of effecting a cure. I usually let the patient make his own choice of treatment without urge on my part after stating various facts to him. The great majority of deposits which cause marked symptoms tend to undergo spontaneous absorption in the course of several weeks or a few months. Usually symptoms cease when absorption is complete but occasionally they persist in lessened degree or recur mildly for a year or longer after the deposit is gone.

Without operation a small percentage of the acute cases experience great improvement usually within two or three weeks and then symptoms continue in chronic or recurrent form. It is impossible to predict which cases will clear up and which will not except the more acute the attack the more likely is the deposit to disappear quickly but this is not invariable. I have known patients to have recurrent symptoms for more than twenty years.

Chronic cases are far less prone to clear up spontaneously unless they develop an acute exacerbation. In my opinion acute symptoms are due to an increased hyperemia which in turn is apt to cause absorption of the deposit. I am not convinced that any treatment expedite disappearance of the deposit. I at one time conceived the idea of feeding patients on a calcium free diet to create a calcium hunger on the part of the blood and thereby hasten absorption. But alas the biochemists informed me that all food contain calcium and that my idea was impractical. Physiotherapists claim that diathermia causes absorption but I have not been able to observe any benefit from it in my cases. In my previous paper I referred to Harris having claimed cured by diathermia but he apparently referred to symptomatic benefits he made no mention of follow up studies.

grams. He has since reported 1 case with skia rams before and after some thirty treatments with diathermia and it is interesting to compare his case with Fig. 5 in my paper. His deposit was smaller than mine and his showed only partial absorption in the same period in which there was complete absorption in my case which was treated by his physician only by the use of morphin to relieve pain. I do not recall the name of a surgeon who reported 7 cases of calcareous deposits all cured by the use of an altheive plaster shoulder cap. The physiotherapists rather generally ignore nature's efforts at absorption and ascribe all improvement to diathermia. I hope some physiotherapist will try diathermia on a symptomatic deposit as they are not prone to underestimate spontaneous absorption and the real value of diathermia can therefore be determined. Injudicious massage and passive motion have been responsible for bringing on an acute exacerbation in several chronic cases that I have seen.

Operation in recent acute cases causes immediate cessation of bursitis symptoms but the same brilliant results are not obtained in the chronic cases. Operation will immediately abolish the symptoms of the exacerbation but will not promptly terminate the milder longstanding symptoms of chronic cases. The deposit needs to be removed in the prolonged chronic case however in order to bring about ultimate relief. This rather constant difference in the results obtained by early and late operation is a rather strong argument in favor of operation during the acute state as the patient experiences complete recovery in less time than the chronic crippling symptoms otherwise would persist. The individual especially if he is a laborer anxious to return to work at the earliest possible moment had better be operated upon. The lady who objected to rather unhealthily working on the shoulder usually preferred the latter and more uncertain outcome of non-operative treatment.

**Technic of Operation.** Operation is accomplished by using a fine needle from a hypodermic syringe. It is inserted under local anesthesia but I usually employ general anesthesia. The surgeon should equidistant himself before proceeding with the location of the deposit determined by the telescope and by the av-

An incision 2 to 2½ inches made from the edge of the acromion down toward the insertion of the deltoid. This incision should correspond to the course of the deltoid fibers and for convenience is usually placed at the front of the shoulder. It need not immediately overlie the deposit as the latter can easily be brought under the incision by rotating the humerus. The incision is carried through the skin, fat and deltoid fascia and then the deltoid fibers are separated from one another to gain access to the roof of the thin walled bursa. With a little care the roof can be opened to permit inspection and palpation of the bursa. Many writers report total excision of the bursa but this is obviously impossible without first dislocating the shoulder joint. By manipulation particularly pulling downward on the humerus there is barely room to insert a finger into the space between the humerus and acromion to explore the bursa which is about the size of the patient's palm. Occasionally a deposit may rupture into the bursa but I have never encountered an instance of it at operation. It cannot be too strongly emphasized that calcareous deposits normally are found beneath the floor of the bursa and not in the bursa itself despite frequent statements to the contrary that still appear in the literature. Unless the surgeon is aware of that fact he is apt to miss the deposit entirely. About four years ago Stern published a very plausible paper in which he reported several cases showing deposit shadows on which he had operated and found only fat tabs which he removed and which were completely soluble in ether and alcohol. There can be no question but that he completely missed the deposits in his case probably because he sought for them in the bursa or its wall rather than in the supraspinatus tendon. Real deposits are not soluble in ether do not exhibit any fat under the microscope and habitually show calcium on chemical examination.

The deposit usually can be seen or palpated through the floor of the bursa. Incision through the floor frequently enters the deposit but often the floor can be incised and peeled back and further incision made into the underlying supraspinatus tendon before entering the deposit. Exceptionally when the



depo it lies on the deep aspect of the thick tendon it can be neither seen nor palpated and it must then be sought by deep incision parallel with tendon fiber at the site indicated by the skiagram and localized sensitive area. At times these deep-seated deposits apparently project into a pocket in the humerus or into the depression just above the greater tuberosity.

The deposit may be single or multiple. Multiple deposits are found at one at one may appear as a single shadow in the skiagram. I have seen hundred of pinhead-size deposits which caused one homogeneous shadow. The consistency of the deposit may be fluid muhly or firm and gritty. The entire deposit should be removed. This often can be accomplished by spooning it out with a blunt curet but often some of the infiltrated tendon needs to be trimmed away. Codman sometimes sutured the floor of the bursa into the defect of the tendon in order to augment the blood supply to the latter. Some surgeons suture the floor and roof of the bursa and close the incision without drainage. I think patients should have a more comfortable and shorter convalescence if bursal suture are omitted and a drain is inserted through the deltoid to stay open three days. Beginning the first few days after operation patient should be encouraged to use their arm freely and employ special exercises to restore full range of motion.

Non operative treatment requires morphine during the hyperacute stage and aspirin. Hyclate compounds or other antineuralgic drug for less acute pain. Pain in the majority of patients is benefited by light heat in the form of electric pad, hot water bag or diathermia but the occasional patient obtains greater relief from an ice bag. In old weather especially at night sufficient clothing should be worn to keep the shoulder warm. Patient should be encouraged to use any arm motions which produce or relieve the pain. They tend to increase the inflammation. Mole the adduction with the arm resting on a pillow placed between arm and chest to relieve the suprapinatus and give more relief particularly at night. During the hyperacute stage patients huntarily hug the shoulder to the chest but during the later stage the shoulder is held away from the chest.

should be instructed to keep the elbow at the side of the chest. This may call for elevation of the floor or seat or depression of machine piano or work table. Chauffeurs should grasp the under surface of the steering wheel instead of the upper with the affected hand.

The tendency to habit contracture from holding the shoulder constantly in the abducted position should be combated by having the patient carry out once daily the maneuver described by Codman. The patient stands with knees kept fully extended and bend over to touch the floor with his finger tips. This is the only painless method that can be used to bring the arm into full abduction. Some surgeons treat these shoulders in abduction at an angle in excess of 90 degrees. This is the ideal position for treatment but it has proved too irksome for the patient for routine use in my cases. Judicious massage of arm and shoulder muscles other than at the bursal site lessens atrophy.

In late case after pain has subsided special exercises may be required to overcome restricted motion due to contractures.

### HISTOPATHOLOGY

I now take pleasure in introducing to you Dr. Case who will tell us about the histopathology of some of these cases.

Dr. Case: The following is a list of the cases which I have had the opportunity to examine. The first case is a 35-year-old male, a chauffeur, who had been suffering from pain in the right shoulder for several months. The pain was worse at night and when he was at work. He had been treated with rest, ice, and painkillers, but the pain continued. He was referred to me by Dr. C. M. Schmitt, who had been treating him for several months. I examined him and found a moderate swelling of the right shoulder, tenderness over the acromion, and a limited range of motion. I ordered a roentgenogram of the shoulder, which showed a normal appearance. I then ordered an arthrocentesis, which yielded a small amount of clear, straw-colored fluid. I sent the fluid for microscopic examination and culture. The microscopic examination showed a moderate number of leukocytes, mostly neutrophils, and a few mononuclear cells. The culture was negative. I then ordered an arthroscopy, which showed a moderate amount of synovial thickening and a small amount of debris in the joint. I removed the debris and the thickened synovium. The patient was then treated with rest, ice, and painkillers, and the pain subsided. The second case is a 45-year-old male, a chauffeur, who had been suffering from pain in the right shoulder for several months. The pain was worse at night and when he was at work. He had been treated with rest, ice, and painkillers, but the pain continued. He was referred to me by Dr. C. M. Schmitt, who had been treating him for several months. I examined him and found a moderate swelling of the right shoulder, tenderness over the acromion, and a limited range of motion. I ordered a roentgenogram of the shoulder, which showed a normal appearance. I then ordered an arthrocentesis, which yielded a small amount of clear, straw-colored fluid. I sent the fluid for microscopic examination and culture. The microscopic examination showed a moderate number of leukocytes, mostly neutrophils, and a few mononuclear cells. The culture was negative. I then ordered an arthroscopy, which showed a moderate amount of synovial thickening and a small amount of debris in the joint. I removed the debris and the thickened synovium. The patient was then treated with rest, ice, and painkillers, and the pain subsided.

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I am much indebted to Dr J B Carnett for the privilege of  
 studying these cases and to Dr Edgar N Cowan and Mr  
 A G Keller Jr of the Chemical Laboratory for the chemical  
 examination of the deposits

## CLINIC OF DRS E. L. ELIASON AND DRURY HINTON

UNIVERSITY OF PENNSYLVANIA AND HOWARD HOSPITALS

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### CHRONIC DUODENAL ULCER

FEW diseases present the definite symptomatology and chronologic sequence of the same that are characteristic of duodenal ulcer of the chronic type. This is so often true that the diagnosis should be made in all but the exceptional case. In discussing these cases common use is made of the expression ulcer facies, ulcer type, and ulcer triad. The patient with a duodenal ulcer is usually an adult male in the active driving period of life. He frequently is excitable, easily worried, and often is living under some mental or physical strain. The facies often depicts this state as shown by horizontal furrows on each side of the mouth, a tense look to the jaw, and flattened cheeks. The upper jaw is often somewhat narrow and the upper median incisor projects beyond the two lateral incisors. The angle of the mandible tends toward the acute type. The above is descriptive of the so-called ulcer facies. It must not be thought, however, that all ulcer cases have this lean and hungry look. Ofttimes the healthy, jovial, round-faced individual is a sufferer, although usually not to the same extent. Physically the patient suffering with an ulcer is the lean and long type, with a very acute costal arch and a low ponderal index, that is, his weight is below a normal average for his height—the ulcer type. Contrasting this individual with the square-jawed, round, smooth-faced patient, with the four incisors on a line, a wide costal arch, and a high ponderal index, one straitaway thinks in terms of biliary disease as the most likely cause of right upper quadrant symptoms.

When the above described type of individual complains of pain beginning two to four hours after eating (hunger pain)

4 S p p t t d d d into the gr ps I A th in  
 fl mmat ry infil t o t s p obl t som hem rrbag (wh h may be  
 the ult f opera e t ma) d d fi cartilage d v l pnt t

G p B h inflammatory hang d calcareo d pos t

Cro p C part cul ly t rest g f d d t on t th flamma ry  
 ph m d l c fca h th f m f po gv bo

5 An h port f d h g th sam pe f flamma  
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th sen wh h ctual b f d by h mroscope d

h fcat ll cal fca h d occurred h d

Th xt case ll tra es th ype h h d ces f flmma  
 br

U f P 899 I th t don-ect on f g h h m wh  
 th re rregula masses f deep l t ed d k bl calcare d po  
 occurring gra les f d ff Wh h e d po occu h d  
 t s s dead

I d d t on cal um sal h m d h f m d f m p h m  
 orrhage \ cell la fil ra d ca f eact fl mma  
 present.

I am much ndebted t D J B Carnett for the pri vle\_e of  
 tudvna\_ these ca es nd to Dr Edgar N Cowan nd Mr  
 A G Keller Jr of the Chemical Laboratory for the chemi al  
 examination of the depo

d od m j t b j d th pyl Th gh m t h d p f t  
 t t g d b bbl f fl j caped  
 Th l se d th t l be g d w th m t m  
 B ca th p lt g f m th e se g f th l se m d t p  
 d ly m l t t f th l d m p t ga t t  
 t my p f m d Th bd m l d ft rt g bb  
 t b th bh p t f  
 P t p t C —Th f t d j ft pe t th p t t m t d  
 mall t f bl ody fl d b t h mp d t d ly ft w t  
 g by m th th d d y Th d g t b w m d th  
 ghth p t j t d y d th p t t d h g d w th h l d w d  
 fit d y ft h dm

**Discussion**—This case is an example of the type of duodenal ulcer in which the first symptom is perforation. These cases are frequently misdiagnosed as was this one. With the perforation there may or may not be a leukocytosis so that this symptom cannot be depended upon in making a differential diagnosis. Frequently the gastric or duodenal contents drain down the right side of the peritoneal cavity giving acute tenderness and rigidity of the entire right side of the abdomen. This symptom is often mistaken for the usual sign of appendicitis and cannot always be relied upon as this case shows.

The outstanding symptom of ruptured ulcer—acute stabbing pain in the epigastrium—was overlooked in this case.

On opening the abdomen the diagnostic signs are often found long before the ulcer is visualized. In early cases the injected serosa with peritoneal fluid in excessive amounts and often with flakes of lymph floating in it usually is characteristic and easily distinguished from the homogeneous murky pus found in the ordinary bacterial peritonitis. Often bubbles of gas escape making the diagnosis of ruptured viscus certain.

The treatment of early cases varies. Resection of the ulcer is rarely advisable. Often the best treatment seems to be a cauterization of the ulcer followed by an exact oversewing. The question of performing a gastric enterotomy is a matter for the operator's judgment. The state of the duodenum after the oversewing goes on to some extent. If sufficient lumen remains the patient may often be closed without further operative work. If in the operator's opinion the lumen is so narrowed



relieved immediately by the taking of food (food ease) or alkalin and add to this the history that his attacks of indigestion occur periodically usually in cool weather he is said to have the ulcer triad i. e. food ease hunger pain and periodicity. Frequently the acute exacerbations of symptoms are associated with a period of overwork worry or physical exposure. Many other signs symptoms laboratory data and facts in the history will be found in the vast majority of the cases. As these vary according to the pathologic changes we may divide the patients into four groups.

### GROUP I

Under this heading are included those patients who never have experienced in the slightest degree any digestive symptoms until the catastrophe of perforation of the ulcer occurs. These individuals are usually young in the second or third decade of life often robust and athletic. Because of the absence of all previous symptoms the diagnosis is often mistaken and the patient is treated for renal colic biliary colic or appendicitis and hence valuable time is lost before operation is decided upon. The following history is illustrative.

C. I.—M. B. l. t. y. l. d. l. l. t. 8. D. m. b. e.  
 8 19 5 A. h. l. g. f. m. t. ca. f. t. f. th. h. p. t. l. h.  
 dd. l. se. d. th. se. p. g. p. H. h. l. p. e. d. t. th. Re.  
 g. W. d. d. t. d. f. t. h. case. f. d. gest. H.  
 m. d. b. e. t. 5. f. gree. h. fl. d. ta. g. som. d. g. d.  
 food.  
 T. l. l. h. se. by. g. Ph. c. l. xam. h. d.  
 ma. k. d. g. d. y. f. th. ght. d. f. th. bd. m. ma. k. d. t. d.  
 M. B. m. po. t. d. good. pe. l. Th. h. t. a. mal. d. ct. l.  
 va. g. t. T. mpe. 96. F. p. lse. 96. p. 32.  
 h. blood. ll. 16 900.  
 A. d. gn. f. cu. ppe. d. m. d.  
 Op. f. —U. d. local. h. h. gh. gr. d. h. p.  
 pe. d. f. d. h. so. h. j. d. se. sa. lt. m. d. Th.  
 ppe. d. ce. l. path. l. g. d. d. suffi. f. h. t. b. d.  
 fl. d. d. som. g. b. bbl. h. scaped. f. m. h. bd. m. A. diagn. f.  
 pt. d. p. pt. lce. d. d. h. bd. m. pe. d. b. p. m. d.  
 d. local. h. M. h. m. l. dy. fl. l. d. sc. e. d. d.  
 se. l. b. bll. f. g. scaped.  
 C. s. h. h. d. d. f. p. g. th. fl. d. f. m.  
 th. bh. pat. g. l. g. lce. f. d. h. f. f. h.

d d m j t b y d tl pyl Th gh m t h d p f t  
 t t g d b bbl f fl d cap d  
 Th l d th t l be g d th m t m  
 B ca th p lt g f m th g f th l sc m d t p  
 d ly mpl t t f th d l m p t g t t  
 t my p f m d Th bd m l d ft t g bb  
 t b th bh p t f  
 P t p f C —Th fi t d y ft p t th p t t m t d  
 m ll m t f bl dy fl d l t h mp d t d ly ft w t w  
 g by m th th d d v Th d g t b w m d th  
 ghth p t pe t d d th p t t d h g d w th h l d d  
 ft day ft h im

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C. I.—M. B. mal. ce. y. ld. ll. t. 18. m. Decem-  
 8 19 5. A. h. lgh. g. f. m. st. eet. ca. f. t. f. h. h. p. t. l. h.  
 dd. ly. se. d. th. se. p. g. pa. H. h. lped. th. Re.  
 ce. g. W. d. d. t. d. f. h. case. f. d. b. st. H.  
 m. ed. ce. bo. t. 5. ces. f. gree. h. fl. d. ta. g. som. d. g. d.  
 food.  
 T. h. l. h. see. by. ge. Ph. cal. xam. h. d.  
 ma. k. d. g. d. y. f. th. ght. d. f. th. bd. m. ma. k. d. d. rn.  
 M. B. rn. y. po. t. d. good. pe. l. Th. h. mal. d. re. t. l.  
 xam. gat. e. T. mpe. 96. F. p. lse. 96. esp. t. 3.  
 h. t. blood-c. ll. 16 900.  
 A. diagnos. f. cu. ppe. d. m. d.  
 Op. t. on.—L. d. loc. l. h. h. gh. gr. d. th. p.  
 pe. d. w. f. d. h. som. h. ject. d. se. o. sa. I. m. d. Th.  
 ppe. d. ce. f. pa. h. f. gv. t. d. ed. fi. f. h. t. b. d.  
 fl. d. d. som. ga. b. bles. h. se. ped. f. m. h. bd. m. A. d. gn. f.  
 pt. d. pep. lce. w. mad. d. h. bd. m. pe. d. b. paramedia.  
 d. local. h. M. h. m. f. t. fl. d. d. se. d. d.  
 se. f. b. bles. f. g. escaped.  
 G. y. th. thesia. d. d. f. p. g. h. fl. d. f. m.  
 th. subh. p. go. la. g. lce. f. j. h. f. ce. f. th.

These patients frequently sleep fitfully and have unexplained nightmares. Routinely all the symptoms will disappear with or even without treatment only to recur again after a few weeks or months. In the symptom free interval the patient usually gains weight.

Physical examination of the abdomen usually reveals nothing although occasionally slight rigidity of the upper right rectus abdomini muscle is present together with some tenderness. A test meal usually shows a high acid figure. The x ray will show a deformed duodenal cap, active peristalsis and rapid emptying of the stomach. Vomiting rarely occurs unless purposely induced. Nausea is very infrequent. The following case history is typical.

C s IL.—M S f ty th y mal ma g f mll bega t h  
 pg t p fi y g Th pa pp d t d h l h  
 ft m l w ft t d w th b t w th t m t g It ft  
 ppe d t ght d w se ght k h m f m so d l p  
 Food se m d t g h m m l f A t t w l m h ft d d g  
 d h d t d d l l d p b d d t y g m wh h  
 l red h pa t ly f m th Th ft h t t r v l  
 h pa w ld t b f D g th w k bef dm h  
 p d d bl d m f t ft h m l p t f t t d d t  
 d lkal po d h h h took H co lt t dvised pe t t t  
 m t  
 H say h h be m k f y  
 Phy l E m t —T mpe t 98 F p l 84 p t 20  
 Th p t t w ld l p d mal l d t b h y set T th  
 h d m d t py h d d bl d t l w k  
 Abd m — re f t d g d ty m se p l p bl W d  
 cost l gl  
 Exam t th r w se g t xc pt f d bet d t l  
 R y E m nat —N h t t St ma h f t h  
 typ b t d f t w t d t t Th fl p d pl t  
 xam t h d t t d f ct t t d d d l cap Ad g  
 f d d l l mad  
 Op t —N t x d yg d th th Upp ght  
 p m d A l ge t ppl d l v l d bo t l h  
 f m h pyl ru Th l sed w th ca t ry d th d f ct  
 d A p t g t t t my w pe f m d w th som d ffi lty  
 beca se f th mm b lty f th t ma h  
 P t p t C —Th p t t d d fl t l th se th p t p  
 t d y wh h becam som wh t d t d d d b l h d f q tly Th  
 fl l g t d y h nut d la g m t f b l t d fl d

as to be obstructed a posterior gastro-enterostomy is performed, provided the patient's condition and the surgeon's experience warrant the added trauma and time necessary.

The question of drainage is one which must be decided by the surgeon. No fast rule can be laid down but a consideration of the extent of peritoneal soiling and the character of the fluid will help in this decision. If the perforation is small and the peritoneal soiling is confined to a small area beneath the liver or if the fluid in the peritoneal cavity is clear and watery even though widespread it is often safe to close the patient without drainage. If the fluid is widespread and filled with particles of food and mucus drainage may be the safer procedure. In practically all late cases (rupture more than twelve hours old) it is safer to drain. *When in doubt drain as usual in each case in this series.*

Follow up report. Perfect health since operation two years ago.

## GROUP II

Here are found the cases of chronic ulcer with recurrent exacerbation of symptoms. Pain is the most marked symptom and it is daily occurring from one to four hours after meals. It is described as boring, gnawing, biting, tabbing, burning — is often associated with hot aqueous and gaseous eructations, dyspepsia and is relieved by food or alkali, magnesia bicarbonate of soda, etc. The pain occurs with great regularity at night usually before midnight. Pain later at night is our series were associated with the large callus ulcer. Abdominal pain may be negligible or inciting itself merely as a lightness or heavy feeling.

It is usually in the right hypochondrium about 1 inch to the right and 1 inch above the umbilicus. Sometimes it is in the epigastrium and may be referred to the back or even to the right iliac fossa. This latter pain possibly is a result of spasm of the ileocecal valve causing intestinal colic pains. Excessive smoking often exacerbates the symptoms. The appetite usually remains good and the patient frequently gains weight unless they are losing blood. Melena of the occult type is very common and the hemorrhage occurs occasionally.

The indicated surgical treatment of the chronic non obstructive type of ulcer is open to considerable debate and is to be decided largely on the surgeon's ability and experience and the conditions found at operation. When in thin patients the duodenum can be easily exposed and assistance and previous experience justify the more extensive operation resection of the ulcer or partial gastrectomy are to be considered. But when as in this case the operation is to be performed on a fat individual where technical difficulties are great or when experience in intestinal surgery has not been great it is safer to oversee the ulcer and perform a gastro enterostomy.

Obstruction of the jejunum below the stoma is fortunately a very infrequent complication following gastro enterotomy. The symptom usually do not appear until several days after food and fluid have been given by mouth. Belching upper abdominal distention and vomiting are the usual signs. The important thing is to recognize the condition early as it is a high intestinal obstruction. The x ray is of greatest value in making the diagnosis.

Early operative intervention is indicated once the diagnosis is made. In many cases the cause of the obstruction can be easily relieved in other it may be easier to perform a second anastomosis above and below the obstruction. For this reason latterly a longer proximal loop is being used in this clinic. This facilitates such secondary surgery. The treatment here used with the insertion of a gastrojejunal tube was unusual but proved efficacious in this case. The improvement noted almost immediately after the gastric drainage was returned into the jejunum is a striking example of the value to the body of the normal digestive fluids in contrast to the artificial fluid substituted for them.

### GROUP III

The patients of Group II automatically graduate into this group as the ulcerative character of the lesion becomes more chronic fibrosed rigid and contracted the result of scar tissue. The stomach meanwhile has undergone hypertrophy. When this occurs the symptoms change. The pain becomes negligible

A ft sc p c va t h d l t ct f th j jun m be  
 y d th g st o- t ro t my pe g d th xt d y p t cally ll f th  
 ba m m l as t ll f d th ma h Th patie t gi gast  
 f g h h acu t d bo 1500 f b i t d ff l O the l th  
 pos ope t d y sec d pe t p f m d d p l thesa  
 Th p pe d N l ce f pe t t f d b t  
 dhes h d f m d h h t ruct d bo h th p ximal d th d stal  
 loo

Aft l se th l p ll ppe d too ha ply gled t the t ma d  
 t ma k d th k g f th ga tr l m t d th pe g f th  
 t mos h h seem d m h d A g t t m d d  
 d g t l xam t v l d t m d h f th d finge  
 f d ed ma d d t seem d t f h A j j j j os-  
 torny d d l k se g t t m pas g th t be th gh th  
 t ma h th gh h ga t j j m m be d th j j n j j ost my  
 h d t l loop f d ta f l D h h h d f f ed g th  
 pat t d g t f th p

Th ou d c. ed ou t l l e t h d pl ced t th oper t  
 t At h cl se f h pe 60 f m l sal sol t d 500  
 f t d blood gi h

Th d f ll g h pe th t r k d bel hed  
 freq ly A j be -ert d h gh h se d d d larg  
 m f b i t i f f m h ma h f h d th rem

co d th t ma k d p f f h f h ff l  
 V Cl gl se d pep d m l k gi h gh h g t j j l tube  
 Th pat t th m h p f p h k th

l ky k ow p l e i l f l o o l p H p h d com  
 pla f f v h xia d l b

O h f i f h d y t pe h l d l d t h j be  
 ll ed t ff h g j j l be p l h p h h  
 mal se

loup m h p j j t l t m h l H pod  
 ega d gth d l g k f ood d ff d b h so th t th  
 j t t t l mpe l l l l

Th f ll g d th j l g j l be  
 da la

Th pat t d sch g j d t h h f  
 F ll p -Th e h l h f f f h l h

**Discussion** This patient presents the type of patient in which medical treatment alone probably has proved unsuccessful. He has a thin manly build, thin ulnar type with narrow jaw and a larh but a nile (to be stout with the wide larh) of frequent association with gall bladder disease. His history and examination were typical.

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Fg 407 —C III G H N t th m f th l g d  
t m h It th hype t ph d fight g t m h d b d th t t  
N t th pyl d f mty Iso

I l t eekl Th re t t th po d d d t l ed h m com  
 pl l l th ee re g h h beg h f l d d tres h  
 bd m < oet ted th l l h g l fl t l ce H h d se l ta f  
 h rp t k k p l g pe od f se v l th Th pa ceased  
 h pla l l l sa d l tre ft t g H ha d ll  
 g f h bd m l h h rece l h h begu t l e gh H h  
 te se ted d h m d l ce  
 Ph -l va l t el gat cep th bd m Th  
 l h gh l g d rr d t l d h th pat t t d V r v ma ked  
 l l d l bl pe l d Th gt t l h d h h  
 l figu  
 R R p t -Th h h ed l plet hou ced  
 Th re ia k d co t h perpen l l ost rel t pe tal  
 Th m t l co d ralf les th co un rat Th d  
 p l e space h h p r s l h h th v m t Th d odense p  
 l u g d j se ted m l p p r a ce lth gh th re b al  
 p d f e  
 D g -C t od od l lce h p l n os  
 Oper A f -l d p l es hes gh paramedia  
 v l l m h h th k ll Th lee } h  
 d l th p l ru l m k d cat l g f th l m Th l  
 a se red d po- gat j j wt m p f ed th p m l  
 l j f od e l gth  
 Th p t h l f l co l see ce th h ce l f l  
 ec f h l l l f h p t l g Th l red j p mp l d th  
 ll g fro l o l re h co gem t t co h H  
 l ch rged cell t co l t gh ex d f pe  
 F ll p report es h h pe fec l ll h pt

Discussion—This case needed but little comment. The picture was typical and the urinary findings indicated. The conal cence was free of every appreciable feature except the atelectasis which occurred despite the breathing exercise.

#### GROUP IV

Should the Group III cases appear perforation and hemorrhage they automatically fall into this group. Again the picture changes and the symptoms follow the pathological change. The ulcer now has become cicatrized and the lumen of the duodenum narrowed. Adhesion binds it to both the duodenum and the pylorus and obstructs it in the dominant factor in the picture. The patient now begins to have constant bloated distended feeling in the abdomen associated with nausea and finally he soon produces metallic taste. Loss of weight and obstipation

appear and soon vomiting occurs every second or third day. The vomitu will contain food taken the preceding day. Excessive thirst, a dry skin and scanty urine make their appearance. Visible gastric peristalsis may be noted although it will be reduced in frequency. Gastric lavage reveal a stomach content of several pints. The x ray shows a decompensated stomach very much enlarged with diminished peristalsis and having almost complete twenty four hour retention. When a case reaches this stage the acute catastrophes of ulcer rarely occur. This group if treated surgically before dehydration or starvation has occurred gives results nearly comparable to those of Group III. Case IV fall into this group.

C IV—D mp t d t m h w th npl t t t F S  
 ml g se ty th y f t g w h d lw y b w ll pt  
 th th dm tt d ft l se q t g th th h d l y h d a w k t m  
 h H h d w k d t f d m t f h l f d h t g h b t h d  
 b g l t l h f d d m y g S th t t m h h  
 ook d f h m self  
 Th m th bef dm th p t t f t t d th th be m  
 d t d l a f h t d th ft h b g t m t t f q t  
 t l G d lly th y mpt sed f q f ry  
 t th d y t m ry d y Th t g se m d t h  
 l t t m l b th h d m a k d f l g f d m f r t f t m  
 b f m h h w l d ft r w d Th m t t d f  
 w t r y m t d f l d d t d y b l d D g th  
 l t f w m th h h d l t d l l g h t  
 Phy I E t —Th p t t l d m a lly k l  
 th gh m t lly l t d pe t H k loo d th  
 fl bhy g g d f m k d d hyd t  
 M th—ll t th m d T gu drv  
 Cl t—m a k l mphysem al  
 H t—s d k m m ca l t y t l  
 Abd m —caph d k l t d g d ty L p l  
 p bl m f d  
 T t D g —G t pl m b tru t g d d l l  
 G t ly h d m ked g t t d b y l a  
 R y xam h d m pl t h t t St m h w  
 d h p d d l t t l pe t l bl th fl pe Th  
 t t d f ct t g f th pyl ru h h d d ppe  
 th film  
 R D g —P l t w th m pl t h d d  
 d l t t t b t m m l k l t b lce f  
 th bse f y m k d pyl d f t

d l t b eekl Th t m t th po d d d t l ed hum co  
 pl l t l th ee y g h h beg t ha f l es d d tres t  
 bd m soc ted th bel h g d fl t l ce H had se cal tacks of  
 h p k g pa d g pe od f se l m th Th pa ce sed and  
 h g f h mpl f f l d d ft g H h ed swel  
 te se t d d h lth gh ce tl h h begu t lose gh H h  
 Phy cal xam t m ted l ce  
 lth gh l g d l t l g t  
 t l d l bl pe t l d t d d h th pat t t d l r ma led  
 d figu d t Th g t l h ed b b  
 R R so —Th m h h d lm compl hou ed  
 Th m t l t ma k d co t hype pe t l lmost t ly pe tali  
 p l p h h pe d h gh h c m Th d oden cap  
 cap d fect d p se t j mal p pea ce l h gh th re b sal  
 D g —( d od l l h p l t  
 Op i v —l d p l thes gh pa media  
 led m —l d p l thes gh pa media  
 d l h p l ru d m k d ca c l Th gh pa media  
 se d d po t ga j j t m pe f med h p ximal  
 loop f mod length  
 Th pat t h d f l l sce ce h h cep f l  
 as f h l l be f th gh l g Th l d p p mptl d th  
 ll g f m d o d m h co g m t gh H as  
 f ch g l cell d h gh tee d y f pera  
 F ll p p rt ta h h pe fectl ll h p m

Discussion —Th ca e n e i but littl comment The p  
 ture was typ cal and the u gerv cl a ly and cated Th con  
 valescenc wa f e of every disagreeable feature except th  
 tel ta is wh h o cu ed lesp te the br athin ex rcises

GROUP IV

Should the Group III s e cape p f ation and hemo  
 rhae they automat lly f ll nto the group Aga n the p tu e  
 chan es nd th mptom follow the f thologi chan The  
 ulc r now h become catrized and the lumen of th luodenum  
 r o ed Adhes on b nd and d to t l th the luodenum d  
 he pylorus and ob tru tion th domin nt facto n the pictu e  
 The patient now b oins to ha a c nstant blo ted h tres ed  
 elin in the ab lom n a so ated with nau ca for which he  
 on p duces mes f l f Lo f w ht nd n t pat o

appear and soon vomiting occurs every second or third day. The vomitus will contain food taken the preceding day. Excessive thirst, a dry skin and scanty urine make their appearance. Visible gastric peristalsis may be noted although it will be reduced in frequency. Gastric lavage reveals a stomach content of several pints. The x-ray shows a decompenated stomach very much enlarged with diminished peristalsis and having almost complete twenty-four hour retention. When a case reaches this stage the acute catastrophes of ulcer rarely occur. This group if treated surgically before dehydration or starvation has occurred gives results nearly comparable to those of Group III. Cases IV fall into this group.

C IV—D m p t d t m h w t h p l t t t F S  
mal g ty th y frut g h d l y b ll pt  
th th dm tt d ft l q t g th th h d l y had w k t m  
h H l d w k d t f d m t f h l f l h t g h b t h d  
b g l t l h w f d d m y g S th t t m h h  
k d f h m l f  
Th m th b f dm th p t t f i t t d th t h b m  
d t d d ft h t d th ft h b g t m t t f q t  
t r v l C d lly th mpt m ved f q v f m y  
t th d y t m ry d Th m t g m d t h  
l t t m l b t h b d ma k d f l g f d m f r t f t m  
b f m w h h w l d ft r w d Th m t t d f  
t r y m cu t d f i d d t d y b l d D g th  
l t f m th h h d l t d b l w g h t  
Phy l E m t —Th p t t l d m bly w k l  
th gh m t lly l t d p t H k l se d th t  
fl bl g d f ma k d d h y d t  
M th—l t th m d T g d y  
Ch t—m k d mphy m l  
H t—d k m m ca l t y t l  
Abd m —caph d k l l t d g d ty L p l  
p bl m f d  
T t D g —G t pl m b t t g d d l l  
G t ly h w d k d g t t t d h y l  
Ray xam t h d mpt t h t t St m h w  
J h p d d l t l pe t l w bl th fl pe Th  
t d f t th g f th pyl wh h d d t ppe  
th film  
R D g —Pyl t w th mpt t h d d  
m d l l ce t b t m m l k ly t h l w f  
h hse f y m k d p l d f t

D n g t h p e r i o d f l d g i l a g q t e s b y p o c t o c h  
 d h y p o d m o c l  
 O p e t — P p l h — l o c a l t h R i g h t p a m d i a  
 A l c e w f d j t d t l t t h p y l r u t h m k e d c a l  
 c o n t r a t f t h g u t N l m c o l d b e p a l p a t e d A p o s t g a o  
 o s m a p e f m e d B e f l o s r e t h e s t h e s i a f t h b d m i n l  
 l l w g m d b y s e c d j e t f o c a  
 P t p e t C — T h p a t d d r e m a k b l y l l m m d l  
 f l l g p e r a t A f t h r s t m p e 99.3 F p l s e 96



F g 408—C s e I V F S l l l h m a h f d e c m p e s a h  
 o c c r r d N h m o o h l f f p e l a

p r a t 0 H t o o k f l d l l f i p e e c m d d t h k  
 d t h b m h H o m e d b F l g o o d A t b o  
 o o n t h t h d p o p e r a t e d h d d l p e c e d p a h g h t  
 c h t H s e e m e d k m p e 101 F p l s e 112 p r a 3  
 d c o s e a l l d b e h d l l h h p o l H e a r t s o d  
 f p o o q t T h f l l g d p e s s g n p s e  
 h g h t b a s e R p r a c r s e d d l 48 A d i a g n o s i s f p l  
 m r y m b o l m d  
 T h p a t d e d t h f l l i n g d

**Discussion**—The patient is an example of a long standing untreated ulcer in which the symptoms caused by it were either slight or minimized and laid as he says to a weak stomach. The ulcer led to cicatrix formation which in its contraction produced gradually increasing pyloric stenosis and in turn gastric hypertrophy and finally dilatation. No amount of medical treatment could help this patient.

When vomiting has been a prominent symptom a careful preparation for operation is necessary. Fluid in large amounts (3000 to 4000 c.c. per day) should be given by rectum and by hypodermoclysis of which saline and glucose solutions are the best.

The operation is best performed by the least shocking method. Local and splanchnic or spinal anesthesia is often indicated especially in the older patients.

The operation of choice is a gastro-enterostomy since in these cases of chronic ulcer with pyloric stenosis it has given almost uniformly good results with a considerably lower mortality.

The pulmonary group of complications in our experience is most common following operation for ulcer. The upper abdominal incision and tight dressing frequently employed often lead to decreased aeration of the lungs and since coughing gives considerable pain the mucus which is formed is not expectorated leading to bronchitis or bronchopneumonia when an infective organism invades the atelectatic when the mucus plugs a bronchial branch. The prophylactic treatment has already been described.

In older patients associated with an emphysema and myocarditis hypotatic coagulation or pulmonary embolism may occur.

C V—P f t d t th m lt pl mpt t G H g  
f y h d ff d h tt k f ppe bd m l p f m y  
y Th t k n t h f m l d so t d  
th g d ru t t F d d d h d l y l d h  
pa H h d so ght m d cal tm t f h d sc m f rt  
Ea l th m m g f Oct be 9 192 h p t t h d dd t  
t f se p j b th mbl H m t d b t t  
l d A m g d t d th ll t lt d f  
h t t m h p m d h l



D g th period fl d g l g q t tes by p ctocly  
 d hypod m ly  
 Op t —P pl h —local th Right pa m dia  
 A lee f d j d t l t h pyl th m ked t c l  
 t t f h gut \ l m ld be p lpated A po r ga t  
 t t my pe f m d B f los th sth f th bd m l  
 ll gm t d b sec d j f oca  
 P t pe t C —Th pat t d d m k bl ll mm d l  
 f ll g pe t Aft t h t mpe t 993 F p lse 96 es-



Fig 408—C se IV F S Ill th m h f d mpe sa h  
 oc d \ h moo h l f f pe l wa

p t 20 H ook fl d ll t fi pe m d d th kun  
 d th b m h H om d b ce P t ls good A bo  
 oo th th rd po t pera e d h dd l pe d pa h gh  
 h t H se m d w k t mpe 101 F p l 112 p 32  
 d coa se al co ld b h d ll h h po ly Hea d  
 f poo q lt Th f ll g d pe g p < t  
 th gh b se R p cr sed dl 48 A d gnos f p l  
 m ry mb l m d  
 Th p t d d h f ll g d y

Full g pe t th t mpe t h d ual d i t  
 f ca f l e m t t w t t l th t ty se th p t pe t  
 d y th t l m t t f m t f th ght d ph gm w t d d d p  
 t t l p p t ly p d d p A y f m d th  
 fi d g h w g hgh ght d ph gmat d m w th c l l t f g  
 be eath d d fi t fl d l l (Fg 409) U d l l th p



Fg 409—C se V G H Ill th hgh d ph gm d th  
 fl d l l of th bd ph gm t il ct Th p t l pe f t d  
 th ry h b f p t d th y t k tw ty d y  
 ft p t

f th t th l t d th p t ll ry l Th t ph  
 l l t t d d th b l cat l b dl p t d d  
 d d th gh pe gm d th r  
 Th p t t d h g d ty d y ft h dm  
 F ll w p p t Th pat t t l d d p f  
 h lth

**Discussion**—This patient represents one of long standing ulcer with no trial of medical treatment. On the contrary he aggravated his condition by frequent alcoholic debauches to which habit can be partly laid his late admission to the hospital.

The widespread moist râles in his chest are common findings in the late case of ruptured ulcer and often predispose to pul-

Soo h the pa t rned It co t t b t ry th ee t  
 fi m tes t seemed t becom m se H m d t t rva  
 th ghout th d y R l t m tak gh pa f th ft effect f  
 fi -da dru k g Pl t t d magn m t t m t f h h  
 t rned th m t

H dm t d th L e y Hosp l th g f th d y  
 ft h ttack. H d l great pa and ted any tt m t t  
 m h m E ry b mp f th mb l ce ltr b ght g a groa  
 Ph l E m l om - T mpe t 100 F p lse 128 p t  
 4 blood p ss 13 /7

Ch t - rr co tal h d h ll praty ry cu M t  
 rales d bl th t ch  
 Abd m -th bo d l k g d ty e th l d m m t  
 m k d th p ga t m T d pcc l l d pg m  
 d M B m y po t P r t d m h d d th lght  
 d t t

T lat D g -D od l l rupt d h rt h  
 Ope t -\ t d vyg l cal Th gh paramedia  
 th bd m pe d d scl g h t p cal gla ry d m t t a  
 soc ted h d belly Th pe t l ca ty fill l th  
 t b d fl d d f p t pe f d l er l ed bo t l  
 h f m th p l ru th t f ce f th d od m Th l  
 rse ed h bd m ga l h rm sal sol d dra

g vert d t th pel d M r r so po h  
 P l p l l -D g th f w po pe e d y la ge  
 m t (3000-4000 ) f fl d b b hypod mochy d o  
 l On th th d d y t d h fl d g by m th T m  
 pe 100 F p lse 90 p 4 H ge ral d t  
 co g g b t h beg bec m d so d m tally k g ld ly  
 t f d agreeabl d t fy g d m Th mpt m becam m re  
 ma k d th t f ll g d d d g f d l m  
 m d ba-ed h h t r v f h l h i m h h bta ed  
 f m m mbers f h f m l

O h sixth d l pe t h pa fi t compl d f pa  
 th ght d vam f ll g bserved h  
 gh pa t d gla d H m ppl ca mpl yed d m th  
 h d fru l g g keep h m h l d p m t  
 sal a y secr Th f ll g j h h pa ll m ked d  
 h begi g t d rn ss th t j f l m ed so h t  
 th pa t h d be ed l l good h d rept  
 f lght m f d t h bd m l co d se med progr  
 sa f t l Wh blood ll 6300 Bla l d d ge  
 d local h w pe t m d f h p Th p  
 d l ped d r rh wh h pa ed w h gh r cool f t  
 d Th pel bsc ss d m l d h p t d  
 b regula ung d red cr g h l q l d mlk d m h h dd  
 f b m h Th f q bo l m m d h f pos  
 bed had p od d beg g dec h l

with a mixture of equal parts glycerin and lemon juice often prevents the dry mouth associated with mouth breathing.

The necessity for a liquid diet makes it imperative to stimulate salivary secretion by some artificial method. The use of chewing gum or even paraffine wax alternating with fruit lozenges is routine. Hot applications in the shape of old fashioned flaxseed poultices bandaged over the gland and kept warm with a hot water bottle are employed. Gently stroking on the outside of the cheek along the duct line will frequently dislodge the dried plug of pus from the duct opening and permit sufficient drainage. Incision is indicated as soon as it can be determined where the abscess is located.

Subdiaphragmatic abscess should be suspected in every case of ruptured ulcer with continued septic symptoms. The diagnostic points were well demonstrated in this case—high fixed diaphragm, tenderness on inter rib percussion and of confirmatory x ray finding. After locating the abscess with an exploring needle drainage is indicated preferably transthoracic in type.

#### ANALYSIS OF 137 CASES

The following data were obtained from the senior writer's service in the University of Pennsylvania and the Howard Hospitals. In the last six years 137 cases of chronic duodenal ulcer were operated upon by the authors and one other member of the staff. These cases do not include reoperations nor cases complicated by other serious surgical conditions such as carcinoma of the stomach, carcinoma of the gall bladder, subhepatic abscess secondary to an old ruptured ulcer, nor those cases too ill to be operated upon. It does include 4 cases of double ulcer.

Only 19 of the 137 cases were females. The second decade of life accounted for 20 per cent and the third and fourth decade for 60 per cent of the cases. Of acutely perforated cases 9 of the 32 occurred between the years of twenty one and thirty and 10 of the 30 were between the years of thirty-one and forty.

**Pain**—The most common symptom was pain. It occurred in 103 cases in the series and in all but 21 was described as of the hunger type and appeared one to four hours postcibal. In

monary complications unless special precaution are taken to avoid them. One such prophylactic measure which we have used with considerable success is to have the patient take ten full inspiration (widely expanding the lungs) every hour when awake.

The operation and operative findings were typical of old perforation and even before the peritoneum was opened the characteristic glairy edema was noted in the peritoneal tissues.

The operation indicated in the late cases is *the least that can be done to close the perforation and preserve the lumen of the intestinal canal*. If at all possible only an oversewing of the ulcer should be performed. Drainage is practically always indicated.

The postoperative course of this patient presents some unusual and some more or less common complications which follow operations for duodenal ulcer.

Delirium tremens as a postoperative complication is becoming more and more rare. It should not be overlooked however especially in patients who give a history of chronic alcoholism.

Diarrhea may occur following operations where too large a stoma is made in gastroenterostomy and in some patients following a liquid diet especially one high in fat. The ordinary postoperative diet for these cases in which cream is used to supply the caloric requirement is a good example. A reduction of fat and an increase of soft carbohydrate often is of benefit.

The factors which most often seem to predispose to the development of acute pyrosis are (1) An acutely ill patient (2) poor teeth and pyorrhea (3) liquid diet for a considerable period of time and (4) mouth breathing incident to toxemia or nausea.

All of the effects are often present following an operation for duodenal ulcer and especially one for ruptured ulcer.

The prophylactic treatment with reference indicated for nearly every case. When practically the teeth and gums should be thoroughly treated before operation and most cases of duodenal ulcer need this treatment. Frequent mouth washes both before and after operation should be instituted upon. In the acutely ill patient a moist gauze over the mouth obviously helps the mouth

Recently x rays and a fluoroscopic examination have been made as an aid to diagnosis in the ruptured case. Such an examination will frequently reveal a fixed diaphragm with demonstrable gas beneath each dome.

Anesthesia varied widely as to type. The earlier operations were done under ether anesthesia. Until recently this was the anesthesia of choice for all perforation cases on account of the relaxation obtained and also because of the fact that many of the perforation cases were operated upon at night when an intern anesthesiologist untrained in gas or ethylene anesthesia was on duty in the absence of the professional nurse anesthetist. At a later period local anesthesia with supplementary paraspinal infiltration was used. Lately spinal anesthesia is being used more frequently.

Operation.—The type of operation varied but little. In 95 of the non-perforated cases a posterior gastrojejunotomy with plication, excision or cauterization of the ulcer was performed. In the early case a short loop anastomosis was performed but in the more recent operations a proximal loop from 4 to 5 inches in length was left. This was done so as to render any future surgery on these structures of easier accomplishment in case of obstruction, marginal or jejunal ulcer. In only 6 cases was excision and a pyloroplasty performed. These were all recent cases. In the perforated case posterior gastrojejunotomy with suture of the cauterized perforation further protected by an omental flap was performed in 21 patients. Eight patients had only cauterization and suture of the perforation. Only one anterior gastrojejunotomy was done.

Postoperative complications, over 25 types, a few of which will be mentioned. Pulmonary complications head the list, there being 6 cases of bronchopneumonia, 3 of lobar pneumonia, 3 of acute bronchitis, 1 of atelectasis, 1 of pleurisy and 1 of embolus.

Postoperative hemorrhage occurred in 4 cases, none of which had a severe result. Right lateral suppurative parotitis and subdiaphragmatic abscess each occurred once, both being in the same patient who the ulcer had perforated thirty-six hours be-

only 8 of the unruptured cases was it described as severe. It was usually spoken of as a gnawing, dull or aching type of discomfort. In 80 of 108 noted cases it was described as being in the right epigastrium. Pain in 60 per cent of the 103 cases was relieved by food or alkali. Vomiting occurred rarely. Even in the 30 perforated cases it was noted in but 4 instances. This infrequency is significant from the standpoint of differential diagnosis from appendicitis, biliary colic and acute pancreatitis in all of which vomiting is a prominent finding as a rule. Hematemesis occurred in 9 cases and melena in 5 and both in 4 cases a total of 21 in the series. Loss of weight was experienced in but 26 cases.

Periodicity or more or less regular recurrence of symptoms was definitely noted in 89 patients. It was stated as being typical. In the other 26 it was considered absent or unnoted.

Systematic medical or dietary treatment had been given to only 28 of the patients. This is a step in the right direction and may be taken as evidence that physicians have joined ranks with the surgeon in considering all chronic duodenal ulcers as requiring surgical treatment. When this attitude is generally accepted the unpleasant and unfortunate complication of hemorrhage, perforation and death will be greatly reduced.

The physical appearance as noted is misleading in many cases if one be inclined to expect the patient always to be of the ulcer type as described above. Of the 109 cases in which a notation had been made 51 were described as obese, 4 as obese, 23 as emaciated, 14 with the ulcer facies and 10 as in shock.

Tenderness was noted as being present in 48 of the unruptured cases and in 28 of the ruptured cases. In 13 of the latter tenderness was definitely noted as being general in character.

Rigidity was mentioned in only 14 of the unruptured cases and in 29 of the ruptured group.

X-ray examinations were made on all the chronic cases when possible. In only 11 cases was a doubtful or negative report returned in cases in which ultimately a laparotomy was performed.

an office. When found three hours later he was still seated at his typewriter leaning over with his head on the machine and his forearms doubled over and pressing upon his abdomen. Another patient had his perforation at 2 A. M. just as he sat up in bed. When seen at 6 A. M. he was in the same position leaning over and pressing his forearms into his abdomen. This fixation or frozen attitude is characteristic and contrasts strongly with the extreme restlessness seen in renal and biliary colic in the early stages of acute appendicitis and to some lesser degree in acute pancreatitis. The perforated ulcer patient resents being handled or moved. Abdominal rigidity is board like and because of this protection gentle palpation reveals merely moderate tenderness. Later the tenderness becomes marked and often is most evident in the right iliac fossa thus accounting for the mistaken diagnosis (2 cases) for acute appendicitis. Vomiting is not a prominent symptom. It occurred spontaneously in only 1 of the 32 cases. In a few other it was induced and in neither type was it repeated.

Prostration is extreme and rapid in its appearance. This condition has been described erroneously in the literature as shock. It is not shock in the accepted surgical sense. Although the patient looks deplete and shows a pallor, anxious expression and a clammy skin yet his pulse will be normal or slightly above normal in rate and his blood pressure will be within normal limits. This appearance was present in the record of only 10 of the 30 cases. The average temperature was 98° F. and the average pulse rate was between 80 and 90, the highest being 110 on admission. Blood pressure when taken usually varied slightly from the normal, the lowest being 110 systolic. The prostration lasts for a variable period becoming less evident as the first few hours pass.

Leukocytosis was diminished in all cases and reported as absent in 20.

Leukocytosis is of little help. The lowest was 4800 and the highest 20,000, the latter in a case operated upon within two and one-half hours. When the diagnosis was in doubt



fore operation. The patient recovered. Postoperative gastric tetany occurred in one patient with almost complete obstruction and daily vomiting for weeks before operation. Through an oversight an overamount of bicarbonate of soda was administered by clisis and precipitated the attack. A hypodermic dose of 10 c.c. of a 5 per cent solution of calcium chloride immediately overcame the difficulty. This mishap has served its purpose with us in that soda is withheld in all cases who have had a long period of vomiting. The solution is 5 per cent glucose in salt solution together with 2 fluidounce of tincture of digitalis given to either by bowel.

Jejunal ulcer is positively demonstrated in only 1 case. This figure should probably be higher but our follow-up service did not reach some of the cases. Doubtless more have occurred. Obstruction at the opening through the gastrocolic omentum occurred in 2 cases. Both recovered after a second operation. One of the reported case histories gives a very interesting account of one of these patients. In both cases the stomach was contracted by reason of the excessive infiltration in the gastrocolic omentum surrounding it. Feeding by the jejunum for ten days resulted in recovery.

There are several would complications including three severe infections, one of which associated with septicemia and streptococcal peritonitis. There were 2 cases of cerebral complication and 1 fatal black Phlebotis cured but one. Delirium terminans present in 2 perforated cases. One survived despite subdural phlegmonitis but the other died. The second case had been intubated for five days and the perforation had occurred nine hours before operation. The patient topped bathin on the table three times and died shortly after the operation was completed.

**Acute perforation of an ulcer, a fatal catatony.** The patient's experience included a mass in the upper abdomen. It is so severe that in the majority of cases it results in local as well as general muscular tetanus. The patient will not move as a rule but may find unusual positions. One of these series had perforation at the duodenum eight days in

an a ray was taken In 2 cases it revealed gas caps beneath the two domes of the diaphragm

Figure 410 shows this condition very clearly This patient's perforation occurred five hours previous to the time this photograph was taken Fluoroscopic report was to the effect that there was no diaphragmatic movements

Gas beneath the diaphragm may be secondary to other conditions as illustrated by the following resume of a case of duodenal ulcer (Fig 411) not in this series because of complications

M W f m l g f t y y m t th O t p t t D p m t  
 mpl g f l f e g h t w k d m ph A y w s  
 t k f th h t d th p t w th t th w f i d d p l g m  
 th g s d th g h t d Th p t t t d m t d t the h  
 p t l b f p c t d p f t f ul Th y h w d  
 h d w th t h y p e p e t l b t b l t l y m t l t y  
 Th t m a h d l t d d th p h m s u g g t d p y l l t r u t  
 Th d f l o s p x a m t t h l t t l l h d th b m  
 h f l y th t m h A t f r t y t w h th e w d the t m h  
 S m m y — P y l b t t l w f th g d th g h t  
 d p h g m th h p b b l y b p t f l  
 O p t v l — Th g h g h t t th p l  
 p s e d d a l g l l l w f l l m d t l t th p y l r u D  
 d h p s e t h t w th g l l b l d d d s e d p t f th  
 d o d m t p t l h d t l t th l D t l l d m h  
 th k d d t t j g l l l d l h h b d p e f t d d s c h g g  
 m a l l t g t th d l m h l h w d d t h w l t t  
 th p o t Th m l t p e j l f l g t m d  
 Th m m d t d d t l g h h y t d t Th l p l  
 t f th g d th d p h g m w l t f th l d p f t f  
 th g l l b l d l l g h th d f d d l p e f t  
 F p l t f th p p e f f t l l h l d f g  
 d h Th d d l l w d d p o t g t j j  
 t y p e f m d Th p t t m h i t l l l d  
 g g g h t

The second case (Fig 412) of gas under the right diaphragm was found in a patient whose history abstract follows

M l g f i t i m t d t h l t y H p l th th h f  
 m p l f p f f h l t h g h t p p e  
 q d f th b l Th p e p l l p t  
 l d p h l l l d d g d t y th  
 g l l l l l Th i k t 16 000 A k f g d  
 h l p l g s l p e l p e f t d l c e v p h



Fig 410—Th pat t l pe f t d fi h p t th jh  
N t th ga sc t eath h d ph gm h d



Fig 411—N h w g h d j d h gh d m f th  
diaph gm Th pa tdd h e ruptu dd od l l b h d h d  
l wpe f t f h g l l bl dd

an x-ray was taken. In 2 cases it revealed gas caps beneath the two domes of the diaphragm.

Figure 410 shows this condition very clearly. This patient's perforation occurred five hours previous to the time this photograph was taken. Fluoroscopic report was to the effect that there was no diaphragmatic movements.

Ga beneath the diaphragm may be secondary to other condition as illustrated by the following resume of a case of duodenal ulcer (Fig. 411) not in this series because of complications.

M W f mal g fo ty y cam t the O t p t t D p rtm t  
 mpl g fl f ght w k d m gh A y w  
 t k f th h t d th po t that th fi ed d ph gm  
 thg de th ght d m Th p t tw t ad tt d t th l  
 p tal b ca se f pe t d pe f t f l Th y h d  
 h d th t hyp p t l b t b l t ly mot l ty  
 Th t ma h d l t d d th ph m gg t d pyl b tru t  
 Th d fl p xam t h l t t l h d th b m  
 h fly th t ma h At f ty tw h th d th t m ch  
 S mm —Pyl b t u t l w f th g d th ght  
 d ph gm th h p b bly b pt f lce  
 Op i N le —Th gh ght t th pyl  
 posed d l g call lce f d l m d t l t th p l ru D  
 dh p se t b t th g l l b l d d se d po t f h  
 d od m t p t l h d l t th l D se t d l f m h  
 th k d d t d g l l l d l h h h d pe f t d d h g g  
 m l l t g t th d l m h h h l d t h l t at  
 th po t Th m l t pe d d f l g t m d  
 Th mm d t d d h gh th y t d t Th l pl  
 t f th g d b d ph gm l t f th ld pe f t f  
 th g l l b l ld l h gh th d f d d l p f t  
 E pl t f th ppe f f h l h d d f g  
 dh Th d l l l w w d d p t g t j j  
 t y pe f d Th pat t m h l t l l l d  
 g g gh

The condensation (Fig 41) of gas under the right diaphragm was found in a patient whose history abstract follows:

M l f l d m t d t th U ty H p t l t l th h f  
 pl t p f f h d at th ght ppe  
 q d f l Th mpe t p l d p t  
 m l l l c l xa cal d t d d g d ty th  
 g l l l l l l h l k 16 000 A t k f g d  
 h l l l s l t p e t d p e f t l lee At p th

g d th d ph gm f d t be in th col wh h lay m d l  
 be h Th l d th ght d ph gm d d on th  
 gh d f th bd m p bably g t l d t l l y h  
 h l f d pp tl l g d l h th sv rse



Fig. 41 — h m flect f g d h gh d m f  
 h diaph gm h h th t pl d gw co d d d f  
 rup d h ll scu Th d g f th dry pl f ll g th co  
 g ll d pl d l f d pe h flect that h ga  
 h l Th l g fl d l l th l f th t m h

rt l po Th pa d d d th pa t d l ll f f  
 fi d y h h xpe ced ck ml h p d  
 d d d y l A ps l d se d ( p se t h first  
 pe ) f ece ga gr ff g t l f h p th p b bl  
 ca se f d h

**Mortality**—Since the statistics were compiled in the box  
 13, cases three cases of perforated ulcer were added making  
 the total 140 which may fairly be used in mortality determinations.  
 In the 105 non-perforated cases the unsociated other  
 serious complications as a whole but helicobacter pylori at  
 its subepithelial anatomical site the effective death mortality  
 of 4 per cent (38 per cent in tabulated from theses).

excluded) In the 35 cases of perforated ulcer there were nine deaths a mortality of 25 per cent making a total mortality of 10 per cent The time that elapsed in the perforation cases had a direct bearing in most instances upon the outcome of the cases that died the average lapsed time between perforation and operation was twenty three hours and of the recovered cases the average lapsed time was eight hours Of course there were a few cases that lived although operated upon in the second twenty four hour period and also one in the third day Two cases succumbed although operated upon within three hours after the perforation

In analysis of the deaths it will be noted that in 3 of the cases an unavoidable complication was the inferential cause 1 had an embolus 1 an early (four day) rupture of the wound and the third an inspiration of vomitus resulting in asphyxia

The rupture of the wound was a result of too rapid absorption of catgut there being no trace of suture material found in the wound at the time of rupture

The apparent frequency of postoperative pneumonia will bear a little explanation Exceptionally was this other than a clinical diagnosis made usually within twenty four hours of death and it should be classed as a terminal complication and actually should not be considered causative of death The symptoms were those of a compression of the organ with signs of lack of aeration and consolidation In no case was it a frank pneumonia picture clinically i. e. chill bloody sputum etc In but one instance was the clinical diagnosis confirmed by postmortem examination

The case of death on the table also requires explanation This was in a negro whose anesthesia had been very stormy and difficult Death was primarily a respiratory one After the heart action had ceased longer than five minutes he was resuscitated with intracardiac adrenalin and bimanual massage by means of a hand in the abdomen and two fingers in the chest through a parasternal wound The pulse returned fitfully at first and in a few moments became regular and could be counted at the wrist Despite all efforts respiration could not be reestablished

lished although the pulse actually remained present for 15 minutes.

In the obstruction case early ileostomy was done in the left lower abdomen using the Witzel method under local anesthesia. In one case this was repeated for ileo-duplex. Instillation of hypertonic salt through the tube was used with advantage in one case.

A point that is of utmost importance in the immediate results of operation is the patient's mental condition. Most of them are

## F. C. S.

		Time before	Condition	Chronic dyspepsia	Case of	Age
+			Perforation	Bilateral neuromuscular	Tumor	days
+	5		Intestinal		Tumor	days
+			P		occluded	days
+			Esophageal	Secondary peritonitis	Esophageal	7 years
+			Cu	osmotic		Death on operation
+			Postoperative		block	3 hours
+			Purulent		Purulent	hours
+			Esophageal	Intestinal	Perforation	
+			block		block	Months
-	8		Sudden respiratory			hours
-	0		Intestinal	Esophageal	block	days
-	0		Scarlet fever	Stomach	tumor	days
-			Perforation		Lardaceous	days
-			Intestinal		Intestinal	days

high strung nervous and frankly frightened before operation. At times they will seriously state that they are going to die. I have never seen the prophecy fail. They be in their ordeal in a state of mental shock. This fright and apprehension figured prominently in two of the deaths.

### FOLLOW UP REPORT

The figures 444 each represent 100 per cent the first anatomic the second economic and the third functional results. In interpreting the report it must be borne in mind that many of the cases have been operated upon only a few months ago and none more than six years.

	CHRONIC NON PERFORATED	PERFORATED
ANATOMIC	56	5
ECONOMIC	1	1
FUNCTIONAL	1	1
400	1	

Report we are obtainable in only 63 of the 103 cases.

Considering the first two groups favorable it is fair to state that good results were obtained in 93 per cent of the cases.

Of the perforated cases only 19 of those that recovered could be traced. The rest all had 444 reports with one exception which developed jejunal ulcer at two different times with perforation each time making a morbidity figure of 0.5 per cent.

In the entire group of recovered cases favorable (444 to 434) results were recorded in 93+ per cent of the patients upon whom follow up data could be obtained.



h held although the pulse actually remained present for 15 minutes

In the obstruction cases early ileotomy was done in the left lower abdomen using the Witzel method under local anesthesia. In one case this was repeated for ileus duplex. Instillation of hypertonic salt through the tube was used with advantage in one case.

A point that is of utmost importance in the immediate results of operation is the patient's mental condition. Most of them are

## F C S

		How long before death	Co. pl.	Chief post-operative findings	Cause of death	Time
	+		Pneumonia	erythema, leukocytosis	T. xanth.	12 d. vs.
2	+		Intestinal obstruction		T. em.	d. vs.
	+		Pneumonia		Septicemia	d.
	+		Intestinal obstruction	Secondary peritonitis	Septicemia	ys.
5	+	30	Acute appendicitis	Perforation, abscess		Death on operation
	+		Obstruction, peritonitis		Shock	1 hour
	+	8	Obstruction		Perforation, shock	hours
8	+		Intestinal obstruction	Perforation, abscess	Peritonitis	3 d.
	+		Shock		Shock	6 hrs.
	-		Septicemia, erythema, leukocytosis			hrs.
	-		Wound	Septicemia, leukocytosis	Shock	d.
	-		Septicemia	Septicemia, leukocytosis	T.	d.
3	-		P.		Acute peritonitis	d.
	-		Septicemia, leukocytosis			ys.

# CLINIC OF DR FRANCIS C GRANT

FROM THE NEUROSURGICAL CLINIC OF DR CHARLES H FRAZIER  
UNIVERSITY HOSPITAL

## A CLINICAL STUDY OF MIDLINE CEREBELLAR TUMORS IN CHILDREN

IN a recent review of the cases of cerebellar tumors in children passing through the Neurosurgical Clinic in the University



Fig 413 — Microphotograph of a section of the cerebellum from a child with a midline cerebellar tumor. The tumor is composed of a proliferation of cells with a characteristic pattern of large, pale, vacuolated cells and smaller cells with more prominent nuclei. The tumor is located in the midline of the cerebellum, between the two hemispheres.

Hospital the frequency with which these tumors were found in the midline cerebellum was striking. Furthermore the ma-



cerebellar hemispheres and arose from the roof of the fourth ventricle. These tumors seem on gross examination fairly well circumscribed but more detailed study always reveals areas of infiltration in the surrounding cerebellar tissue. Microscopically the predominant cell is irregularly round or oval in shape with scanty cytoplasm and large oval nucleus containing abundant heavily staining chromatin material. On low power study the cells appear as a loose structureless mass in areas forming pseudorosettes or elsewhere arranged in strands suggesting a spindle cell sarcoma (Figs 413-415). Blood vessels are numerous, much of

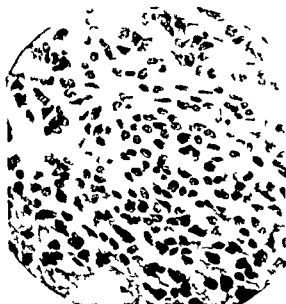


Fig. 415—Midline cerebellar tumor. Photomicrograph (×67) showing the typical histological features of the tumor. The cells are arranged in a loose, structureless mass, with some areas forming pseudorosettes. The nuclei are large, oval, and contain abundant, heavily staining chromatin material. The cytoplasm is scanty. The tumor is composed of a spindle cell type of cells.

the fine connective tissue stroma of the tumor is confined to their walls. Mitotic figures and other evidences of rapid growth are easily demonstrable. By proper staining method with Horgan's method, the tumor is composed of a spindle cell type of cells and a few highly differentiated cell types may be identified and the internuclear material

jointly of these tumor in this location were of one pathologic group the medulloblastoma. Since therefore one certain type of neoplasm appear to originate in a particular area of the cerebellum it seems worthwhile to consider the clinical features connected with a tumor of this variety in this location. Are these symptoms of such uniformity that their appearance justifies a preoperative diagnosis of the position and type of the

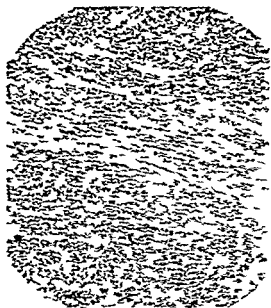


FIG. 414.—Microphotograph of medulloblastoma. H. and E.

lesion. If such a diagnosis may be made with certainty, the proper treatment and the prognosis.

This report based on a series of sixteen histological tumors termed a medulloblastoma. The term medulloblastoma has recently been adopted. Bellevue (1) in the retrospinal with a tumor found in the spinal column. de C. (2) and H. (3) have recorded the lesion was situated in the midline of the

cerebellar hemispheres and arose from the roof of the fourth ventricle. These tumors seem on gross examination fairly well circumscribed but more detailed study always reveal areas of infiltration in the surrounding cerebellar tissue. Microscopically the predominant cell is irregularly round or oval in shape with scanty cytoplasm and large oval nucleus containing abundant heavily staining chromatin material. On low power study the cell appear as a loose structureless mass in areas forming pseudo-rosettes or elsewhere arranged in strands suggestive of a spindle cell sarcoma (Fig. 413-415). Blood vessels are numerous, much of

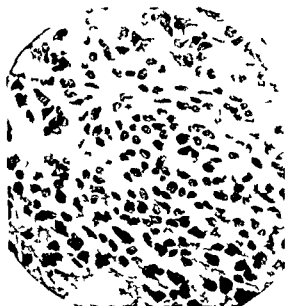


Fig. 415—Microphotograph of a midline cerebellar tumor. The image shows a dense population of cells with large, dark, irregular nuclei and scant cytoplasm, characteristic of a midline cerebellar tumor. The cells are arranged in a disorganized, structureless mass.

the fine connective tissue stroma of the tumor is confined to the walls. Mitotic figures and other evidences of rapid growth are easily demonstrable. By proper staining methods with Hortega's fourth variant both neuroblasts and more highly differentiated cell types may be identified and the internuclear material

shown to be made up largely of the proce se of embryonic glia cell

The 2 cases here reported are typical of the clinical picture these children present

C e L.—Fra k B M W ght 11  
 Ch f Compl t—H l h m g f l g  
 Se m th g se f tal head h bega be g pec lly se  
 h m m g Th se h d h mpa d by spell f m g  
 Aft tt k th pat t ld f ll t d p l p f t h



Fig 416 C se l N be l k h d h l b f l pose  
 gk g F hl h d m

F m h g d pl p l l ped d h m l f  
 fi d H pare d h h l f d l lgh l  
 Th ee m h h 'omm ed se f m h g f ll  
 t d gge h h lk d

Th h t r y l m t s o y l m t i w  
 se P t d l d o c l h t y l t  
 N l g c x a m t e l d h n k y t h f t h l l t l l g t  
 d p e t Th k s e m d u l l y s o f t w m d t h N  
 p b h d t W h l t h w l d t b f f t t h  
 h l l d b t d l y t d d t d d p t y Th g t l w g g t l y  
 m l l A l t h g h t k g d c e f d d y f t o t d  
 r t h l t h w h l m a k p f t h h l d g g t d h y p p t t  
 C b m — N y m p t m p t g t t h l t f t h m t  
 se r y y t m t d l f f i t y g h t m d t b t l f i l d  
 Th f l l t t  
 C b l l m — Th g d y w t h d f i t d g f t h b  
 l l g H l d t t l t h f o o t l Th a m t



Fig 41 —T m t m d f m C l

l d y m t f i g t i h l t k t t B l t l d d k k  
 b d l p a t p o g N t g m d M k d  
 h y f l s e t  
 C l N — F p f t h p t r v h j h d  
 b m t Th s e s e f m l l p r v d b o t h d Th  
 h l d m p l l b l d h l f y t h p s e f l i g h t p e p  
 t l y h l g h q d t f h g h t Th w b l t l  
 p t t p h y f m l l p a p l l t h y Th o c u l t t  
 f l l m l Th l s e f y t g m m t g b e m  
 p l l p l f p e f m d Th y t d l d m k d  
 f l l l l l a e h l y p e f t h l d p o e s e C  
 l t l t h d p f h u t p e t l



C m t—Th hld ff d d ry t t g p bl m d gnos  
 F m th log fi d g th t m might be ce bell f m th ray  
 d doc po t t ld be p sell R t oscop xamun on  
 g d fi l t wh th th t t phy p mary d t  
 p t ry d sease seco d ry fl g t cr i p ss Th er  
 bella ympt m ld be ca sed by cr ved l p ssu B t  
 p t t y t m hll m t mm l f th Rathk po h type  
 d d t f ca se t l hyd oc ph l F th m these tum  
 f q tl h l fic t th ll f th cy t N th g f th k d  
 ported f m th y t d H d fi t ma ed t pe  
 f m pe m t t th p bl m ld ha ve been sol ved t f  
 p t u t r v m p od l t mpo l h m ps A po t fossa le  
 ca b g bo t f th sella d t gu h bl f m th t sec  
 dary t p sell g th by ca g t l hyd oc ph l As  
 l h th l t l d l t d d t th sell d d th  
 l d l h case m h th se se f m ll d fi t ly ffectd  
 l fica se dj t t sell th ce bella mpt m re  
 ll ma ked d th p se ce f po t fossa l might cco t by  
 p ss f h doc d y fi d g diagnos f m dl  
 bell l mad It h l l be t l h t th bse f y stagm  
 d d p t th loc i zat f th t m th g  
 A ce bell pl t b D G t l d m dl t m p g  
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 b block g th q ed cr M ra h my post perat x cou se th  
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 m t w t d Th case mph ze th ec ss y f ea ly diagno  
 so th t pe t r v may occ b f m pl t pt t ph

C II—E h l C W F se v l l Adm ed 4/12/28 R  
 f d by D B re Ch ce  
 Ch f C m pl t—N m g h d h d pl p  
 P t III—Th ee m h g m g d sex f tal h d  
 h mm d Th d d f fi k h h d h  
 d m g b g m t se h m g  
 I mo h p dm h m pl d f d pl p dh pare  
 l h h h d l b m h l f y Sh l d f  
 pers ed f l d ed h h gh h d se l N d ha g  
 f m h t d A h m h h d h ee g l d ul  
 h h h f b n m j h m sel  
 pa l d N l cal d t d S ce h  
 t m h h be p l bo b h bee b served h h becom g  
 l m d lk h d base Sh d y f ll ea l d th f tal  
 h d h h e eappe d  
 P t M d l II l—N m l f l l t m h b perf t h l h p t  
 th g f t A h h d ll f cert l g  
 fi m h d g h h h ld po d m d f q ly Sh

th d d ppa thy n al b th d t l m t lk g  
 H h lth h be ll t f mth t t m  
*F m ly H st y*—l l t  
 V l g E m t —Exam t l d co pe t  
 t ll k t h ld w th p t l mpl t N d f do dy  
 f t t d Th h d w t l g d Th w gg t  
 k d pot so d d lght b p t l t d Th l rv  
 g t p t f mpl t p ly f th l ft VI d h k d d k



F g 418 —C II

f f d p th h f h h m r rh g P m t f ld  
 l l t t ct bo h fl b m f t d  
 m ll t se sory l m be g J  
 Th fl ll bse M k d hypot p t m d  
 l g Wh l l g t d mal h d f t f l t th ght  
 lk g bo t h D fl l l g th th f t th t d m  
 po d d pe ll h h ght th ght l g l th  
 l l g p h l l f t l t h l t Wh l d d k k

ma k d both h d pec ll th ght th fi ge o- ose d past  
 po t g t ll pe f med h bo h h d Th heel to-k ee test  
 h ed ma led o-o d t espec ll h th l f l g A lght fl k  
 g h t l t gm ed occa b h b-erver  
 f led t fi d t

Ray t d f th h d l d l t ph d separa m  
 f h t es Th p r fossa rm l

C mm t—I f th dd se f ympt m th g f th pa  
 l th lght th gh f fi bell ympt m diagnos f cere



Fig 419—C sc ll N pos f sca gh bo be  
 ee h ma d

bell m p bahl h m dl mad H e ce h mp-  
 t m l f l d h poss b l f gh d ee b l l co ld be  
 e looked Th Roe ge d h g cmal p r f sa  
 ll th mal l fi ld l m d h g h se f h m  
 Ope (D Cra )—Bef expos g h ce bell f sa t cul  
 est mat d bo h la ral e les be g f d quall la ged  
 Th po fossa a h posed d m fl m l g h  
 rm d f m h oof f h f h l p rt ll m ved  
 Th m d d l rall h f ce f h b m h d  
 O l h part f h m co ld be rem ved h h h d oc l d d h q

d t At th t m t f th pe t fl d ld b fl w g d w  
 f m b h g th t tl b p l fl d l t h d bee  
 block d P th l g c xam t h w d th t m t b m d ll bl t m  
 Th h ld mad u tl l r ery Sh d f d p  
 y th pyp t h d scl g f m th h p t l d tw th m l  
 t tm t t t r l f week S th t t m t th t tm t  
 th m th pa th b g Wh l t sc J 1929 h  
 d t m l d f p ld b d t m d by l mb  
 p ctu f d xam at Th b p t l l mp t  
 t se

## DISCUSSION

The case represents well the clinical findings of midcerebellar tumor. The sudden onset of pressure symptoms which may show remissions, the later development of a rather vague and elusive cerebellar syndrome, the cracked pot sound to percussion over the cranium, the absence of well marked nystagmus are all suggestive of a lesion of this region. When compared with the cerebellar symptoms produced by a tumor of the cerebellar lobes, the paucity of typical finding in vermis lesions is striking.

Symptoms.—The history these children give is so uniform as to have definite significance. At the onset the average age was eight years, the oldest fifteen, the youngest three years. There was little or no difference between the sexes. As these tumors develop in size they at once impede the cerebrospinal fluid circulation. As a result the earliest impressive symptoms are those of pressure—vomiting attacks with headache. These bouts of vomiting and headache are usually considered by the attending physician as due to gastro intestinal disturbance and the child treated accordingly. Curiously enough the vomiting and headache come on intermittently as though the tumor blocked the flow, caused pressure symptoms and then the fluid forced itself past the obstruction with relief of tension.

Since the cranial sutures in young children have not completely closed, as pressure develops compensatory separation occurs and the head enlarges and becomes box like. And very fortunate it is that the sutures do separate as pressure develops for otherwise many more of these children would be totally blind before the true nature of the condition is recognized. Enlargement of the head relieves pressure on the optic nerves to some

extent and prevents prompt and early visual loss. Furthermore at this age visual loss does not mean much to the patient and as it develops gradually does not cause much complaint. Little by little the parents notice that the child is becoming clumsy, it falls more easily and the gait is uncertain. Over a third of the case in this series developed a diplopia which was often the first bit of evidence leading to the suspicion that the vomiting and headache might be due to an intracranial rather than a gastrointestinal condition. Finally an examination of the eye grounds is completed which reveals a choking of the disks confirming the presence of intracranial pressure. Admission to the hospital usually follows. The average period for the development of symptoms prior to hospitalization is five months, the longest period ten months, the shortest three months.

On first examination a very few degrees may be hazarded as to the position and nature of the lesion by anyone who has seen many of these cases. The enlarged head with the definite cracked pot percussion note, the marked cerebellar gait with at times more pronounced in the trunk and legs than in the arms, the hypotonia and areflexia, the suboccipital tenderness and often slight retraction of the head in a child with a history of sudden onset of pressure symptoms present an unmistakable clinical picture. But that the first education in this matter was slow is evidenced by the fact that in 2 of the cases in this series a diagnosis of suprasellar lesion was made and an operation carried through without appreciable result.

With regard to the cerebellar symptoms, it is the impression on the part of those who examined these children that the trunk and legs are definitely affected more than the arms. The extremities were usually equally involved. A unilateral predominance of certain symptoms was unusual. A tendency to fall backward was particularly noted in 3 instances. Considering the position of the tumor on the midline involving the vermis, the fact that the ataxia was most marked in the trunk and legs all bear out the clinical impression that the area of the cerebellum had specific control of these reflexes. Nystagmus was not easily detectable in 10 of the cases.

17 case That nystagmus may be absent in midline cerebellar lesions should be remembered for it has always been considered almost a pathognomonic sign of cerebellar disease The lack of this symptom went far toward clinching an incorrect diagnosis in one of the patients under consideration

In 2 case cerebellar fits were noted with retraction of the head and tonic spasms with stiffness and rigidity of all extremities

Diagnosis —The accessory examinations Barany tests a ray eye ground and perimetric tests gave no information of value In fact the Barány test done in seven patients placed the lesion above the tentorium in four reporting the cerebellum as negative Fundoscopic studies merely confirmed the increased intracranial pressure by describing choked disk The perimetric tests when possible simply showed concentric contraction of the field x Ray studies revealed convolutional atrophy separation of the sutures and in 3 cases because of marked erosion of the sella concluded that the tumor might be in this region That posterior fossa lesions causing a block and dilatation of the third ventricle may thereby cause disappearance of the clinoid process should always be kept in mind Furthermore pressure in this region by a dilated ventricle may produce evidence of pituitary dysfunction by pressure on the pituitary This may make the differential diagnosis still more confusing Ventriculography may help in arriving at a correct localization although in 1 case in which it was attempted misinterpretation of the air shadows resulted in a supratentorial operation If air is to be introduced it should certainly be done by ventricular tap and not by encephalography From the position of the tumor a medullary compression is a constant danger Lumbar puncture even for pressure reading should be avoided In a recent case lumbar puncture and a Barany test were done within twenty four hours The child suffered from a medullary collapse and an emergency suboccipital craniotomy was necessary to save its life

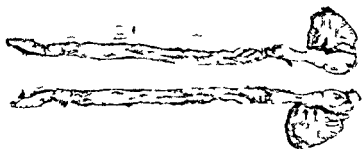
The diagnosis is made on the history the abruptness of onset the high choked disk and the cerebellar symptoms although they may be vague and nystagmus may be absent

extent and prevent prompt and early visual loss. Furthermore at this age visual loss does not mean much to the patient and as it develops gradually does not cause much complaint. Little by little the parent notices that the child becomes clumsy, it falls more easily and the gait is uncertain. Over a third of the cases in this series developed a diplopia which was often the first bit of evidence leading to the suspicion that the vomiting and headache might be due to an intracranial rather than a gastrointestinal condition. Finally an examination of the eye grounds is completed which reveals a choking of the disks confirming the presence of intracranial pressure. Admission to the hospital usually follows. The average period for the development of symptoms prior to hospitalization was five months, the longest period ten months, the shortest a single month.

On first examination very little clue may be hazarded as to the position and nature of the lesion by anyone who has seen many of these cases. The tilted head with the definite crackle upon percussion, note the marked cerebellar ataxia with ataxia more pronounced in the trunk and legs than in the arms, the hypotonia and arrested growth, the suboccipital tenderness and often slight retraction of the head in a child with a history of sudden onset of previous symptoms presents an unmistakable clinical picture. But that the present education in this matter was slow to recognize the fact that in 2 of the cases in this series a liaison with the leukemia made and an operation carried out without effect, the correlation with these results.

With respect to the clinical picture, the impression on the part of the child is that the trunk and legs are stiff and more ataxic than the arms. The extensor muscles are equally involved. A unilateral predominance of cerebellar symptoms is unusual. A tendency to fall backward is particularly noticeable in the latter cases. Considering the position of the tumor in the midline involving the midline fact that the trunk is more markedly affected in the trunk and legs would be rather surprising. It is interesting to note that this area of the brain is particularly involved in these regions. Systematic study of these

tumor as possible but above all to unblock the aqueduct. While it may seem possible to brush the cerebellum away from the tumor without much difficulty on the surface in the depths the line of separation is soon lost. But by careful manipulation from below upward it is often fairly easy to expose the roof of the fourth ventricle and tease away that part of the growth which lies directly in the aqueduct. This has been possible in 4 of the last 5 cases attacked. That the obstruction in the aqueduct is relieved is shown by the free escape of cerebrospinal fluid downward from this region. Once fluid is obtained the operator can safely stop further manipulation if the patient's



Fg 40 - \ p y p m l b p t f t m f d ll  
bl t m typ mdl N t th l m t th gh t th t  
l gth f th p l d h g th d y f th se t m t l  
l gth m g l p d p dl t h

condition is poor. But simply to remove the surface of the tumor without getting away that part which dam back the cerebrospinal fluid circulation is only to make a bad matter worse. The elementary subsequent to the operative trauma may result in a complete block with desperate consequences. Now that we know where to look for these tumors and how to attack them and since with Bovie electrosurgical unit an excellent method of extirpation without producing hemorrhage our operative results should improve.

Following operation removal x-ray treatment is always indicated. It seems uniquely to hold recurrence in check.



Furthermore we know that cerebellar tumors are more common than suprasellar lesions in children.

**Treatment**—Once the diagnosis is made the treatment is in our opinion surgical. To be sure x ray therapy is quite effective in controlling the growth of these medulloblastomas—in fact the tumor was held in check for two years by this treatment alone. But in another instance medullary collapse and subsequent death followed deep roentgenization without operation. Furthermore while medulloblastomas are the common tumor type in this region solid astrocytomas are quite frequently encountered here. These tumors do not respond favorably to x rays. Valuable time may be lost in treatment and the child weakened and so much vision sacrificed by the continuous intracranial pressure that subsequent operation will not be effective. Operation, relief of pressure, excision of the lesion and then institution of x ray treatment if the tumor is radio sensitive is the proper sequence of treatment.

The picture revealed by the cerebellar exposure is typical. The vermis of the cerebellum is widened, the cerebellar tonsil may be found forced down through the foramen magnum. If the vermis is widened but no tumor can be seen on its surface or below between the tonsil the vermis should be incised longitudinally to expose the surface of the growth. Often the tumor presents itself between the cerebellar lobes at the foramen magnum and extends down in a tongue like projection over the upper cervical segments of the cord. At times the tumor makes its appearance on the surface of the vermis and seems to be spreading through the subarachnoid space over the cerebellar lobes. That the cerebellar plaques are highly malignant and may readily infect the meninges has been demonstrated (Elliott 1936). In one of our series of children a partial metastasis has been verified pathologically. In another typical case symptoms have already appeared. The presence of a partial block has been proved by injection of campodol and the Queckenstedt test. In one of the few adult harboring a cerebellar medulloblastoma a partial metastasis was removed by laminectomy.

The chief aim of the surgeon is to remove as much of the



It is to be hoped that the recent cases alive after more thorough extirpation will enjoy a longer postoperative period free from recurrences.

Midline cerebellar tumors in children are commonly medulloblastoma. They produce abrupt symptoms of increased intracranial pressure followed by cerebellar symptoms bilateral in character affecting the lower extremities and trunk more than the arms. Nystagmus may not be noted. While these tumors seem highly malignant and are placed in a position requiring very delicate manipulation for their removal nevertheless the treatment should be surgical. While they are radioresensitive the therapy should be reserved as after treatment to surgery. Decompression plus removal of enough tumor to unblock the fluid circulation and then roentgenization to control recurrence is the best line of attack at present available.

## INFECTED POPLITEAL ANEURYSM

THERE is no doubt that the conservative operation for aneurysm advocated by Matas is the ideal procedure to be adopted for aneurysms which are susceptible to surgical treatment. At times however conditions exist which render it impossible to perform the Matas operation and a procedure or combination of procedures which is best adapted to the case at hand must be used. The following case occurring in a syphilitic is an instance of a ruptured aneurysm which had become infected and in which portions of the sac wall had undergone necrotic changes

Th pat t ma g d fifty f yea dm tt d th P by  
t H p t l D ml 0 19 8 th th ch f m pl t f ll b d  
h l ft k Th k b f dm mall ll g h l h gr d  
ally sed w t d A th ll g l g d lk g f b d  
g th k h m m d ffi lt d th p t tw cap t t d d  
f d to bed t w k bef dm t th hosp t l H d d h v g  
h d h  
Phy cal xam t l d poo ly p h d l l ly g Th e  
ma y ca ceth th l w uall d ypt th h t  
l g d t th l ft d t l m h d botl th mt l  
d rt b th d f d mpe sat Th p t l r  
ll w dm h d th p pl w q l b t t d ry po ly t  
light l mmod t Th w fi m ll g b t th ze f l m  
th popl l pa Af p lsa w p lpabl d d t t t l  
b t d bl th m Th k th p pl t l p h d  
h g f m th m t Th p f f th d sal ped d p t  
t b l t b ly p lp bl Th bl od p w 126/78 t mpe  
t 98 3 F h mogl b 61 pe ce t d blood ll 3 290 000 wh t cell  
9 00 bl od W se +4 A d g f p pl t l ry m w m d  
Th pa t k p bed d l g d se f odd dm t d  
F d y ft dm h d l ped lght f so t d w th c gh  
l h b d f d f w l th t mpe t t d mal  
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gh d f pt ype Th p pl l m t t l t w fi m t so  
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ca se f h p pe f f l l se f l

l m Whl th p pe t d th y fi d gs d cated th  
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 po d ght h p t t m h Ah ry b d f cu  
 pe fi thrit p h p dm l h gh th d ed  
 l th pa t q l t h m Th t mperat 99 F  
 p l e 100 l loev es 13 500 Blood ge 0 blood l d 4 9 d  
 h pl m CO 56 l mes pe ce t Th ly ga e  
 Th g l ed bd m l t d rnes d gnd ty moc pro ced  
 th gh l q l th l d f h sca f th p pera

Se l d y f dm m h f mal ra ge becam  
 ppa d pl ry pe pe f m d th gh h l gh  
 ect m d l h sca f h p pe Upo pe g th pe  
 l ca y th f fl d b t ma f d th local  
 g h h ppe l t be f fl mma t Th g ral pe  
 t l ca y l d ff h ga d l ma pl d l t p d t  
 be bsc ss g r f l m l l g g ee p wh h cultu  
 h d S ptococcu h m l cu Th m l l m th f na  
 m f m d h l f h bscss d ha d ha p po d bject  
 f l p rud g f m h l m d d g th bscss Th f gn  
 bod m d l f d b gul h ped h k bo  
 bo t 3 m l g d l m d b h h pe p d t scape  
 f m th Th pen g l sed d f d b p ce f  
 turn t red e h h bo l l f m h h h f gn  
 bod m d d h d l sed h dra nag A fecal fi l  
 l l p d fi d y f th pe l d g p f se f d  
 S bseq t l th w d d l r v m l l m f y l l h se  
 m t l m t ly T m th f h p h d  
 t l h l d d h h bee f rth d g  
 At th p se m h pa h g o l mpt m  
 bd m l pa h bo l m g g l l h ppe l l d  
 h h g d g l Th loc l h d g pe serv h ra  
 h d f be gn m m l p l d h se  
 f f rth t beca se f h h m compl ca f pe f  
 t occur g t th f l m

prevent septicemia as well as a guard against the development of secondary hemorrhage. These precautions could not be observed in the distal part of the vessel however as it was necessary to oversew the artery directly at its orifice into the sac in order to preserve the collateral circulation. The paralysis of the peroneal nerve was most likely traumatic in origin as it did not appear until the twelfth postoperative day and there was a definite improvement in the function of the affected parts at the time the patient was discharged from the hospital six weeks after the operation.

A p t on f th pe fici l port f th ma perf m d d r  
 local th a d p bt d W th t q t pl ce f d  
 t be ppl d a m ll mad th m dl o th ma th  
 popl teal pace A th et d d be th th k d beu  
 t l sci f ted l mun t d cl t p t d d d f llo d by  
 p f se h m h Th t q t ppl d d sec d on  
 mad bo nl f ld d th f m cal rt ry lg t d H t ca l  
 Th fice f sel mm cat g th th sa t d d th t  
 q t loxe d P f se h rth g or d f m th d tal or fice  
 h g th t good llat l l on ex t d Th fice th su  
 t d o d h bl d g t lled Th gr t p f th ma ing  
 sa ll so f iabl f om a d f t th t at mpt t p lca  
 t on ra mad A cul f th j t d p h d St phylococcus lb  
 Aft th pe t p lsat f th d sal ped th po t t b l  
 rt ld be palpat d b t th t t mty me Th foot  
 f l g e pped tt le t d d h t ppled  
 T l h ft th pe pul t f th d sal ped d pos  
 t b l rt f tl pe p bl A ma k d f b l eact or  
 cu d ft h pe Th firs f day th f g d betw 10  
 d 103 F O h fift d y th t mpe t se l d d 100 F d gr d  
 lly d eased g t mal h l th d y D g f m th  
 d se i cul at ha but g d lly derr sed l th w d  
 w t l losed A d ly blood cul tak fo secu  
 d y f th pe t d hey ll eg t A part l toe-d p  
 l serv d t l d f th pe t po t m ld d pl t -of P  
 pl t w ppl d t h foo d l g d b k g d ma sag g  
 ec h d f mty L d th h py m f th foo i h toe  
 d p mp ed Th p t d sch g d f m th h p t l k f  
 th pe t ll lk b th toe f p had ly d appe d  
 Th pa th t m l d l h d ompl t ly  
 heal l Th pat f l d t po t f f rth t t b h la  
 see ux m h ft th pe t h ppa d sab t

Pa tial di integrat on of clots ma occu n aneurysm ra ely  
 however are they infected in this case It eemed likely th t  
 staphylo occi ente ed the ge eral c ulation durm the opera  
 t on for the patient de lope l a typ al ept c type of fever for  
 se eral days after a j H c r th po tope ati e c urse  
 anl ne ative blood ulture made t appa ent that the fe e  
 was due to the lo al i sect on nd n t to pticem a

The proximal p rtion f th e l va ligat d in Hunter s  
 canal well abo e th pr ximal h be u f th pre ent of  
 infecti n and th nect t c o dit on t the sa wall Th r  
 qu red a sec nd n i ion i h ch a n ler d afer m l r to

prevent septicemia as well as a guard against the development of secondary hemorrhage. These precautions could not be observed in the distal part of the vessel however as it was necessary to oversee the artery directly at its orifice into the sac in order to preserve the collateral circulation. The paralysis of the peroneal nerve was most likely traumatic in origin as it did not appear until the twelfth postoperative day and there was a definite improvement in the function of the affected parts at the time the patient was discharged from the hospital six weeks after the operation.



A p f th pe fi l po f th ma pe f m d d  
 local h d p bt d W th t q t pl ce d eady  
 t be ppl d m ll m d th m d! th ma h  
 ppl teal pace A th vt d d be th th k d subcu  
 t f sca fec ed l m t d l t p t d d d f ll ed by  
 p f se h m rrh ge Th t q a ppl d d se ond  
 mad bo t l fi ld d th f m l rt ry l gated H t ca l  
 Th fice f -el mm cat g th th sa t ed d th t  
 q t loose d P f se h m rrh g oc d f m th d t l fice  
 h g th good ll l l t t d Th fice th su  
 t d re d th bleed g t ll d Th great pa t f th ma g  
 sa ll so f bl f m d f ct th t tt mpt t pl ca  
 t mad A cul f th p t d p h d St phylococcu lb  
 Aft th pe t p lsat f th d sal ped th post t b l  
 rt ld b p lp t d b t th t t m ty me Th foot  
 d l g pped t l t d d h t ppl d  
 T l h ft th pe t p l f th d l ped d pos-  
 t t b l rt f tly pe pt bl A k d f b l t oc  
 cu d ft th pe t Th fi t f d y th f g d b t 10  
 d 103 F O th fifth d y th mpe t settl d d t 100 F d gr d  
 lly d sed t m gt m l th l th d y D g f m th  
 d se p rul t h t b g d lly d sed l th d  
 l l sed A d ly blood cult t k f secu  
 d y ft th pe d th y ll g t A p rt l toe-d p  
 l se d l d y f th pe t po t m ld d pl t -of P  
 pl t ppl d t th foo d l g d b k g d m saag t  
 h d f m ty l d th th py m t f th foot d th toe  
 d p mp d Th p t d sch g d f m th h p t l k f  
 th pe bl lk b t h oe d p h d t t l d appe ed  
 Th pa h m l d d th d mpl ly  
 h l d Th pa f l d t port f f rth t tm t b t h la  
 see m h f h pe h ppa t d b l y

Partial disintegration of lot m occur in aneurysm rarely  
 however e they fect d as in this case It seemed likely that  
 taphylococc ente ed th gene l i culation duri g the opera-  
 tion for the p t ent de l ped a t y p cal septic type of fe er for  
 se eral day ft r d Ho the po toperati e cour e  
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 was due to th local i fe t a d not to ept cem a

The proximal po t on of the l a l gated in Hunter s  
 canal well abo e th p ximal t be u e of the presence of  
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## ILEOCECAL OBSTRUCTION

MODERATE or severe degrees of ileocecal obstruction are not uncommonly associated with inflammatory lesions of the appendix. This is particularly true in the chronic forms of the disease but is occasionally found in the acute lesions. Our interest in this condition has been aroused as relief of symptoms was not obtained in certain patients operated upon for chronic appendicitis. In the e cases we found that the terminal ileum was thickened and either the opening into the cecum was not easily demonstrable because of adhesions existing between the ileum and cecum or the terminal ileum was bound down by adhesions linking it and interfering with the motility of this portion of the bowel. The large number of patients in whom such pathologic conditions were found has led us in the past three years to make a routine examination of the cecum and terminal ileum whenever possible.

While the actual cause of the condition is difficult to explain in all instances, most of the cases encountered were confined to two groups: first patients suffering from chronic appendicitis; second patients having a continuation of symptoms although the appendix had been removed at a previous operation.

The effect of long standing irritation occurring in chronic appendicitis probably produces the changes leading on to obstruction in most instances, although in some patients a history of appendicitis is lacking.

Apart from attacks of appendicitis, constipation and flatulency were the most constant and characteristic symptoms. While the degree of constipation varied with but few exceptions all patients had to take cathartics. Apparently the narrowing of the ileocecal opening preventing the contents of the bowel from gaining ready access to the cecum has been responsible for the flatulency and more or less for the development of constipation. Toxic symptom, particularly headaches, were noted



C s I—V A mal f rty th y f g w dm tt d t th  
P byt H pt l w th th h f mpl t f p th bdom F  
th pat t yea th p t th ff df m fl t l y f wh d f q t  
cath a t t k F ll g th cath h pe d tt k f  
p th l w r q d t f th bd m F th fi t f w m th f h  
ll th p w th g m th d ll h d l t d pp xam t ly  
t ty f h S bseq tly th tt ck sed f q nev l gth  
f d t d th p w m e Th l t tt k w k g  
lat d fo d y d th p w ry h p d t r m tt t Appett  
h b ryp b ca se f th t d yt g f m t n d t p t  
H h had m y d ll h d ch d g th p t tw y wh h h e l  
m sed f q cy d se ty Upo phy cal xam t th bd  
m lightly d t d d d th w m d t t d b t n  
g d ty M B y p t Th bl d co t h w d h m gl b 103  
d bl od ll 5 500 000 h t blood ll 7100 U ly gat  
d fr t l g t ly h w d m l rv A pl t ry  
pe t pe f and th gh l ght ct d l sed  
bl t t d ppe d h h w m d t ly fl m d O xam g th  
l cal j t th t l l m f d t b dhe t t th m  
d fi d by d se dh Th al ld t dm t th t p f th l t l  
fi g Th dh w d t d t th loecal j t d l m f  
th t m l l um leased F ll g th l b t f th se dl th  
l ld be t d ly th th nd fi g Th lt g se sal  
d f t d w th f m t l t pl t mply g th p oc d  
d b d bo Tl pat t mad t f l co y d m th  
ft pe t port th t th h d h h dsappe d t p t  
h b mpl t ly l d d th se f cath t c h d be d t d  
ft b g sed t ly f ma y y Th ca ll t t th m t  
typ l f m fl l b tru t mp d by t ympt m w ll  
tt k f p Tl d g f b t t f d t th p t d ly  
pl d th ca se f th tt k f t mtt t h p p th ght  
l q d t f th bd m f ll w g th W bl th loecal  
b tru t w th f th p t t ympt ms d l f ld t  
h be ft d by mpl ppe d t y

C II—P M mal fifty y f w d tt d t th P by  
t H pt f th h f compl t f pa th ght l w q d t  
d t p t wh h b d be m m p d d g th p t t  
m tl S w k b f dm h d l ped d ll t mtt t p  
th ght l q d t f th bd m wh h id t d t dw t  
mp d by se d m t g Th tt k lat d f ty ght h  
d th tt h h ff df d ll h d d bl bd m l  
d t t Upo xam f th bd m t d m g d ty  
f l d m w p lp bl H mogl b w 93 pe ce t d blood  
ll 4 560 000 dl kocyt 7800 Af t l gat ly h d  
bse f fee hyd ochl d th hgh t t t l cad ty 2 U  
ly w g t A pl t ry pe w pe f m d d  
fl m d ppe l l l k k d d d l l d po tself f d th

when constipation was of long duration. As similar symptoms occur in cases of visceroperitonitis with a low lying mobile cecum at times the differential diagnosis from this condition is most difficult.

In many cases a gastro intestinal study by x ray may reveal the ileocecal narrowing and partial obstruction but this finding is not constant and an exact diagnosis is not always possible by this means. In this event it has been our practice to recommend exploratory operation after a reasonable trial has been given to dietary and other measures carried out by the internist.

When the ileocecal region is inspected in many of these cases a normal appearance of the serosa seems apparent. If an attempt is made to introduce a finger through the valve by invaginating the ileum the opening is found narrowed and at times because of adhesions and thickening of the ileum the opening cannot be demonstrated. If careful dissection is made the ileum can be elevated from the cecum and gradually the opening will become more and more apparent and the finger readily passed into the cecum by invaginating the ileum. One half to 2 cm of the bowel may be separated by this means before a sufficient degree of patency is apparent. Other adhesions or bands should of course receive appropriate treatment.

After freeing adhesions and particularly the ileocecal variety the resulting defect in the serosa is covered by a free omental graft. A thin and well vascularized portion of the greater omentum is used as this is the most satisfactory type of graft. The transplant is carefully sutured over the serosal defect multiple suture is used to obtain good approximation as adhesions to the edge of the graft occur less frequently when this precaution is observed. The raw edge of the greater omentum from which the graft is removed is buried within the two layers of the omentum in order to prevent it from becoming adherent to some portion of the abdominal cavity.

The following case history to be abstracted briefly in order to illustrate the types of pathological lesion encountered the symptoms they produced and the means employed to correct the conditions.

Cas IV—W M m l a d m t t f w t h h f m p l t o f p  
 h l w e g h t q d a t o f t h e b d m T t y t h b f d m  
 h e d l p e d g l d b d m a l p a h h w f i w d b e d  
 o m t g T l h o l t t h p a w l c a l d t h g h t l w q u a d  
 b c a m p g l y w s e m t g o d t h e t m e b f d  
 m t o t h h o s p t l H h d t m l a t t k t h y g w h h  
 l t d p p m t l y f o t y - e g h t b r T m p e t w 9 8 2 F l k o r y t e  
 c o t 1 0 2 0 0 a a l y w g a t T h b d m w s t n d e r t h  
 t g h t d d t h w a m a k d g i d t y t h g h t l d t  
 O p e t w p e f d t h u g h l w g h t e t d t h p  
 p e d f d t b t c a l d t l f l a m d l t w o r t d  
 b o t t m d d l w t h m a y l d l d h d w d p l  
 t f i b e x d a t E p l o t f t h l c a l h d m y  
 h m d h w h h c t t d t h l i j c t T h d h w  
 l b e t d t o v m t h l t u t d t h l t g s e s a l d f i w  
 d t h f n t i t p l t T h p t t d l  
 c o r y d w h s e t w y a f t p e t t t e d h h a d m d  
 y m t f g d g h t d h b l m g g l y l  
 t h t l h p d u d t h c l c a l b t t d l  
 e a s e f t p p e d t W h l o e l b s t t f o u d m y  
 c a t g t l h t y f p t t k w l l y b t d T l  
 d g f l c a l b t t f d l d l l p b b l t y h b  
 p o b l f t t f t h p a t m p t m s l t h g h t e t l y  
 f l a m l p p d h d b m d l t c a s e w f t e d  
 l o r t t l t t m w t h c d t w h h d t p n t p l t f t h  
 f o c l l d t h t m l l m

C s V—M F S t t y f f g d m t t d t h h f  
 c o p l f p a t h g h l q d f t h b d m d f  
 T h t t t h f f d f m t p a t h t y  
 f g f w l c h h h a t k c a h d l y l t h l t f y h h  
 h d m t t k f p t h g h l q l t f h b l m w t h  
 t m p d b y d m t g A d g o f h a p  
 p e d m d M h 1 9 2 7 d t h p p e d m d T h y m p  
 t t l d b y t h p e t f h t p t d t  
 t c k f p b m p g l T h b d m w r l  
 t d d h s e h d h w o d t h d s s l f a t g u h d  
 o c i f l l f w T h t d g d t y f t h  
 b d m T h f l o o d m l d t l l y w g t e  
 A p l r y p e t p e f m d d t h m t m f l t b e  
 a d h t h m t t h t f t h f m o p e t T h m t m w  
 l b e t d t h f x l j x l d d h w t d w h h  
 p a t l l y o c l l d h l o c c a l l T h f e e d d f t t p l t  
 t d l l g p e l d f t T h p t t m a d  
 o t t l r y f h s e e f t p e t l d f t h  
 t t k f p p d h d h e s d h d t d l y g d g h t  
 h d p e T h t y p l s e t h t t o f  
 y m p t m ( l p p e l h l b e r e m l d l l y d m t t

tocecal pa d m d Th loc cal l f dt be mal  
 h e th w d fi t k l g f th l m bo t h f m t t  
 m t d t dl b d g t d t th l t l l Th dh on  
 w se d th k k l ed d th lt se sald f t a d  
 th fee m talg f Th t e se l f dt be dh t  
 th t f ce f th ce d g col j t bo th ceump od g  
 d fi t gulat t th h p t flex Th se dh feed d th  
 su f ce e sewn Th pat t d sch g d f m th h sp t l f  
 tee day ft pe l d f mpt m h bo l t e m d gu  
 l l d th h bee ce f ympt m Th pa t h d  
 d fi hl hyd bef th pe t

The second case is presented as an example of a disturbance of the motility of the terminal ileum caused by adhesions binding this portion of the bowel to the lateral wall there was no apparent obstruction in the ileocecal valve. The symptoms were similar to those in Case I with the exception that the patient did not suffer from headache.

C III.—D M mal t ty j f g dmut ed t h P b  
 t ia H p l t th h f compl t f pa th ght l q d t  
 f th bd m D g th p t y th pat t suff ed f m freq  
 tt k f d ll pa h ght low q d t f th bd m h h  
 mpa d by se b t m t g Th d y b f dm ss th  
 pat t d el ped mod rat l se pain th ght l q d t h h  
 gr d ll creased se e y ce t gh g g t bed At th t m f  
 dm h p h d b d d b t t t ll d bl t d  
 Appe h l y bee good d t bo l h be gul l po  
 phy cal xam on th lgh t d ss d d fi m scul rigidity  
 h ght l q d t f h bd m T pe t d p be  
 rmal th l kocy os d h ly gat E  
 pl ry perat pe f med d ch cally flam d ppe d  
 f d k k d d bo d d b m dh Th l ocecal al  
 ld b t d dl h m l l m bo d d d k k d  
 by dh Th dhes h case d d t p od m k d gul  
 f th bo l j f t l b fee m lgr f red  
 h f ce Th p m d f l ry d  
 ymp m f ce wh se m h f h pe l th t ce l  
 th gh th l bs ru f h leocecal l h re  
 d fi t d t b h l f h d l po f h leum Th  
 k lung so p d h f d C se II d ll th  
 lght t d gree f gul h h dh ma be f sed Adh  
 d d d pa h ff g f m t pa t  
 y p m h th ly lgh d g f g l f th bow l  
 th se case f j h h m l f h bo l f d h ff  
 ly ece t h p oced

C e IV—W M m l w d m t t d w t h h f m p l t f p a  
 t h l g h t q d t f t h b d m T w t y f h b e f d m  
 h d l p e d g l d b d m l p h h f l l d b y s e d  
 m u t g T l h l t t h p a l l d t h g h t l q d  
 t b c a m p g r l y s e m t g c u d t h t m b f d  
 m u t t h h p t l H h d t w m l t t k t h e y g w h h  
 l a t d p p u m a t l y f t y g h t h T m p e t 982 F l k c y t  
 c o t 10200 l y w g a t T h b d m w t d t h  
 t g h t d d t h w m k d g d t y t h g h t l w q d t  
 O p e t p e f m d t h g h l w g h t t d t h p  
 p e d f d t b t c a l d t l y f l m d l t w t t d  
 b t t m d d i w t h m y l d d w d h d w d p l  
 t h f i b x u d t E p l t f t h l o c c a l h e d m y  
 f i m d h h h t c t d t h l l y t T h l h w  
 l b e t d t m t h b t t d t h l t g s e l d f t w  
 d t h f e e m t l t p l t T h p a t t m d t f l  
 r y d w h s e t f t p e t t d h h l m d  
 y m p t m f g d g h t d h b w l g g u l l y I  
 t h t d h p d c e d t h l o c c a l b t d o c d  
 c a s e f c u t p p e d t W h l c a l b t r u c t w f d m p l  
 c a t g t l h t r y f p t t k l l y b t d T h  
 d g r f l o c l b t t f d w l d l l p b b l t y h b e  
 p o b l f t t f h p t t y m p t m l t h g h t h t l y  
 f l m d p p d h d b m d I c u t c a w f t d  
 f r t t l t t m t h d t h h d t p e m p l t f t h  
 l o c c a l l d t h t m l l m

C V—M E S t y f i y f g d m t d t h h f  
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 t T h p t t h f f d f m t p a t c e t h t y  
 f g f w h h h b t k c a t h t d l y l t h l t f y h h  
 h d m t t k f p h g h t l q l t f t h b d m w h h  
 t m p d b y d m t g A d g f h p  
 p e d t w m d M h 197 l t h p p e d m o v e d T h y m p  
 t m l d b y h p e f t h p t d t  
 t k f p a b e m p g l y w s e T h b d m w d  
 t d l l t h d h t l h d w d f t g u h d  
 o c c u l f q l y f t y T h t d g d t y f t h  
 b e d m T h b l o o d m l d h l y g t e  
 A j l t p e t p e f m l d t h m e t m w f d t b e  
 d h t t h c u m t t h t f h f m o p e t T h m t m  
 l b e t l h l o c c a l j c t x a m l d d h t d w h h  
 p t l l y l l l h l c a l l T h y f j d f t t p l t  
 l h l t g p e l d f t T h p a t t m a d  
 f l r y l h s e e f t p e l d f t h  
 t k f p p t o n d h d h l h d t d l y g d w g h t  
 j s e l p e t T h y p l c a s e t h t t f  
 m p f h i p e d l d b e e m v l d l l y d m t



tl l f f l pl t f th l oc cal g cases f h  
ppe d t

C VI—C l fice y f g w dnu t d h h f mpl t  
f bd m l pa S week bef dnu th p t t suff d f m  
tt k f t mtt t l ky p th ght l q d t f th bdo-  
m wh h l t d f rty ght h d mp d by se b t  
m t g S bseq tly l h d h ml tt ks th l t l et d for  
t week d th pa h d j t bs d d t th t m f h dm ss on t  
th l p t l Tl h t rj l t p t h d h  
l po bd m l m t m k d t d rn d g d ty re  
f l M B y po t Th t mpe t 983 F h blood-count  
ml d th ly gat e A xpl t rj perat  
pe f m l d h cally fl m d ppe d f d Th re f w  
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f l oecal bst t h h h p pe lght tt k f  
pa soc t l th pat t mp

# CLINIC OF DR CALVIN M SMYTH JR

METHUEN AND ABINGTON MEMORIAL HOSPITALS

## TRAUMATIC RUPTURE OF THE SPLEEN

In 1924 Pfeiffer and the writer reported a group of cases in which the spleen had been removed for traumatic subcutaneous rupture. At that time we called attention to the fact that while the spleen was not essential to life and that its removal was not followed by symptoms which would contraindicate splenectomy for rupture very little was known about the remote effects of removing the spleen from adolescents. The case which we reported had been followed from two to four years and in every instance the patients exhibited a mild though definite anemia, a generalized adenopathy and lassitude. As a result of these observations we recommended that vigorous and persistent treatment be directed to the anemia. Five years having elapsed since this report it would seem proper that the matter again be drawn to the attention of the profession.

Of the 4 cases reported 3 are alive and well. 1 was killed in a railroad accident. In this report we present 5 more cases operated upon for the same condition, all of whom are alive and well after three to five years. In 4 of the 5 the spleen was removed. In 1 on account of the leprous condition of the patient tamponade was done. In 2 more cases both gunshot wound the spleen was removed with a fatal outcome. A case complicated by injury to the pancreas also died.

C. L.—J. M. G. S. Y. Imitt. It. th. M. thod. t. Lp. sc. p. l.  
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8

lk t h h m i t ppe Fll g th m l h m d Th  
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 m d l h mm d ly m ed t th hosp t l  
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th l t ff t l h f l q t w ll l h gl t th h b  
 t d d d t d d H t l l h h m d th t l l m d  
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C II—F A g y a d m t t d t th M th d t Ep p l  
 H p t l N mb 2 19 6 Sh h d b t k by m t tru k b t  
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 th l f t h l d Exam t l d ge l d g d ty b t th  
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 h d h m o g l b 60 p t r y th cyt 3 100 000 f k cyt 2 000  
 th w d th t y p c a l b l d i t f h m h g A cath t d  
 p e m f f l i t d w y b l d A p p e t d g n f  
 rupt f th pl w m d d th p t t m m d t ly p e t d p o  
 I t f f m l l w b g u th th U d  
 th th th b d m w p d th gh l f t p p t  
 Th p t l c a t y t d m a y b l d l t d d b l f b l d  
 Th pl w x a m d d th f i g t t d d p g u l  
 l t o th f f i t d l r y t w f d th t th l  
 t t d d t th h l d th t l g t y h d b j d j d  
 t t th t th pl p l p A l m p p l d th p e d l  
 d f t p d p l t f l d t d l s e j y t y th  
 pl t m y w m d th l m Th b d m w l d w th  
 t d g Th p l t th l f t h p t w 140 l f  
 ly f l m d b g l b l f t f 350 f 10 p e  
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 Th p t p t f h ch l d w t ly t f l F  
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 m d y f t p e t d y x a m t l d h th t  
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 f i c a f th h l d p th c a w th f l d t d  
 App m t ly th y f t p l t m y th h l d w g d  
 h r y l t l d f f f m th h l d f h g Sh h g r w  
 m l l y d d g t th t d d t b l ly l p d d w g h t  
 Sh h m d s a t f t r v p g h l d h b t l t d  
 d d t l p Sh h h d t c u t f t H m th  
 t t th t h ly m p l t l t t f t g Th l  
 p thy d l l j f m a A b l d t m d J ly 13  
 1929 h w d h m g l b 9 p e t d blood l l 4 620 000 w h t b l o d  
 l l 8500 Th d f t l c o t h th l l t c r  
 lymphocyt

C III—L V g th t y d m t t d t th M th l t  
 Ep cop l H p t l A r l 6 1923 t l l p m A t 4 l k th f t o o  
 wh l d g l l l g th d g f l o a d p l t f m h f l l d t r u k  
 h l f t l f th k l l p t t g t h l f t h d t b k

th f ll h f bly t d d th w t H mpl d t fgr t pa  
 th h t dw t t t bl thth t f mpa t lk  
 fi ty block t th h pt l l th d t dh w xam ed by  
 d t phy wh d gn ed C ll f t d fra t f t h  
 th l ft d Th t d d B d pl t th h t trapped  
 d th boy t t l t t t th g l d pe sary th f ll g  
 m m g ll ll d h m b t d d t f l r w ll d h l eat gh  
 g m l h f t d O g g h m t d d com  
 pl d f th fi t t m f p th bd m H b ght t th h  
 pt l t cab Th t mpe t p lse l p t 966 110  
 d 24 p e t ly Th bd m g d th gh t d q t ly t  
 d bo h ppe ll q d t th l ft Ov th l l ft h  
 d ppe l ft bd m th pe t d ll Th d l fi t ed  
 th h g f po t A bl d t h d h m gl b 65 pe t  
 d blood ll 3 120 000 h t blood ll 19 000 A cath t d pe m  
 f g t f blood A d ga f pt d pl mad  
 d th pat t p p d f pe t  
 U d th h th bd m w pe d h gh l ft pre  
 t d p t g th pe l ca tyth t m d  
 ga h f blood W th tl cap f th bl d th pat t t t coll pse  
 th p lse b cam l t mpe pt ll th p l w d h ll  
 d th l h lk l k I t e f h h h d t be st red  
 l h gh som m d d g t t d 20 m m f d l  
 g th d mm d mp m d Th  
 bl d g th l cat l m g f m l t f th l bo d f  
 h pl d th g self se t be lly lag d t h  
 d e p pl dh l h t t q k t co  
 d d d d l g ga pack d d t th l t d  
 th bd m p dly l sed m d m d ga d b g pl l  
 th l gl f th d H m d t th d f d  
 d l ll h l po pe t out l d g hypod moc  
 l t ce d ly f h d y  
 Th al see ce t my ma y y V m t g lly  
 pe t t d y mpt m f p lyt b t ct ppe d th fifth d y  
 Th se f ly m by se f d try h a h t  
 f menta h b l m l g t l g N mp mad t  
 m th pa k l h h d y h h d be m d h th  
 d secr h m l m d d t d hes d  
 se d ry bl d g oc d V th lag g d pl ced  
 d n t h pl f h po h d d ll d f t f m m t  
 d l ped Th d m j h fifth l y f th pa k d  
 th f h l f h pe Th d h f rrg d  
 d ly h l 3000 po m pe ma ga d ll d h l by g l  
 t Th p l sch g d h l rt a d d f pe  
 I Ap l 19 h boy g dm l f ll g t m bl  
 cid h h h h l bee h n f k gh bd m  
 f ce f ll mpl d f gr pa d h d d th f h h g b  
 h b d gn f h h m rth g hock f xam p

tally g t b t h h d l g l h th gh th l p t  
 fh a H h d t d f f l w p m t d h d d  
 th g b t t lth gh b h d b pe t dly d d l y th t d  
 At th d f th d y h f l p f t l w l b t t t d th t h h l h d  
 g d d l f d g t d t p t h pe t d th t  
 ca h h d h d se r t l ght l w b d m so t d w t f  
 f d m t g  
 H w t gly d d t t y th h p t l d h h h  
 p d d h ppe d m d H f l l y se t d t d so Th  
 f th old p t d d th l y f t l b d m l w l l p  
 t d f p b l Th p p d b cut ly f l m d l  
 m d S t f t r y m t f th f l l d t b mad  
 f d dh b t ca f l h f l d t eal y p l m p l  
 t t th t t It w p b l t l se th p t m w th t  
 rupt d t b t th d f t th f w t g t t b m w th  
 t g t t Th p f th h p l t d w th l g t  
 f f se l t ft th t h f C l l Th p t t mad t l  
 t f l al Th b y g l h l th h w y b m  
 p d by th j r y t h p l H w k e y d y t m l  
 l b p t

Ca IV K t F g t ty f y S ma U S N y d m t t d  
 t th M th d t Ep p l H p t l N mb 26 13 6 F ft m t  
 b f dm h h d b t b l d th b d m l y b t d wh  
 th l f d ty h h d t t m p t d t m tw dru k l f m  
 l H b ght t th h p t l t cab E m t l d  
 t b d 3 h l g th p s t m w th m t m p t r u d g f m  
 t Th w dw b l d g p f ly Th h k th t m p t  
 p l d p t w 98 98 d 24 H w t m p  
 H w p t d p m m d t l d th th Th t b  
 d l g d p w d d l w w d d p d xam t f th  
 b d m mad B l l g t d r y f ly Th t m h w t  
 j d b t se p f t f th m l l t t f l Th se  
 l d by p t g t f h m catg t d f l w th l mb t  
 t f l B l d d w l l t t h w d f m th l f t d f  
 th b d m Aft p k g f t w f d th t th f l p d l h d l  
 l m t m p l t l y l d f l m w ry d t p  
 t b q t g g —th b l d p p ly h g b p l t l y d  
 t y d l d t f l t t th m l t m d  
 th gh th l f t T l b d m l d w th t d g Th  
 p t t l f t th t b l b d i d f f d y h d t f l  
 t m O th f i f th d y h d l p d b ru m p t wh h p d t  
 b p ly t d d p t t t T l d t k  
 d t th p bu h w t p o s e d Th b t t  
 y m p t m l d l y t d g f th m l th t l J t t  
 t be d f l p p l d l t t d p f t th m th o d  
 d b e d l y M l l h w ha m p l d h se ma t m  
 th g t t f Th l D k d A l l l t f f

th f l h f bly t ded th wr t H mpl d t f great po  
 th h t d t b t bl thth ta f mpa to lk  
 fi ty blocks t h hosp t l l th d t d h xam ed b  
 d t phy h d gn sed C l f t d f ct f t y  
 th l ft l Th r t d d B d plant th best trapped  
 d th boy tru t d t t m th gcal d pe sary th l flow g  
 m g H lk d h m b t d d t feel r l l d h i ting h  
 g m l h f t l O g g co se h m t d d m  
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 d ppe l ft bd m th pe ss t a d l Th d l l t ed  
 th h g f po t A blood co t h d h mogl b 65 pe ce t  
 d blood l 3 120 000 h t blood l 19 000 A cath t ed pecimen  
 f ga f blood A diagn f rup l plet w made  
 d th pat t p pa d f pe t  
 l f h h th bd m pe d th gh l ft ppe  
 t d po gth pe t lca t th w trem dou  
 gu h f flood W h th scape f th blood th pa t t collapse  
 th p l e becam lm mpc cpt bl th esp t l d h low  
 d th col l lk l k l t f h h h d t bee st ried  
 ea l th gh m d t d g ted 20 m f dren li  
 go th d mm dia mp m t t ced Th  
 bleed g th l cat d m g f m l t f th l bo d l  
 h pl d h ga self see t be l l g d t ha  
 d se r pl dh l h t t q k co  
 f d d d l ge ga pack t od d th l ce t d  
 h bd men p dly l sed m d m zed ga t d as be g pl ed m  
 the t gl f th d H as t med the d u f d t  
 f d ll h l po t pe t out l d g hypod moc  
 ly d ly f h day  
 Th l sc ce my ma y y V mu g lly  
 pe d mp m f pa ly b tru ppea d h fl h d  
 Th se sat f ly m b co rse l se d try h sa hot  
 f m h bd m d ga t l k N mp m d t  
 m th pa k l h h d h h d bec satu ed h h  
 w d ser h m l m d d vid h d  
 seco d ry bleed g occ d A h l ge ga tt d pl ced  
 d th pl h m h po h d d l d f ct f momert  
 d l pet Th d m d h h f h d y f h pa k d  
 h f ce h d y f h pe Th d h f m t d  
 d ly h l 3000 p m pe ma g d ll d h l b gr l  
 Th pa en d ch g l h h rty sec d d f pe t  
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tually g t b t h h d l g l h th gh th l part  
 f h ca H h d t d f f l l w p xam t d h d d  
 th g bo t t lth gh h h d be pe t dly d sed by th t d so  
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 good d l f d t d t p t h pe t d th t  
 occa h h d h d se p th ght l bd m t d w th  
 fev d m t g  
 H t gly d sed t t y th h p t l d h h h  
 p d l h ppe d m l H f l l y t d t d Th ca  
 f th ld pe t ex d d th l y f th b l m l l l sep  
 t d f po bl Th ppe d w b cut ly fl m l d w  
 m d S t f t y ex m t f th pl ld t b m d t  
 f d se dh b t ca f l sea h f l d t eal y pl mpl  
 t t th t t l t w po bl t l se th pe t eum w th t  
 rupt d t b t th d f t th f se t g t t be m w th  
 t gr t t Th p f th h w mpl t d th l g t  
 f f l t f t th t h f G l Th p t t m d t ly  
 ev t f l al se ce Th boy g l h lth h w be m  
 pa d by th j ry t h pl H w k g y d y t l  
 l b p t

C IV—I t F g tw ty f y S ma U S N vy d t t d  
 t th M th d t Ep p l Hosp t l N mb 26 1926 F ft m t  
 bef dm h h d b t b b d th bd m by b t d h  
 th l f d ty h h d t t p t d t m tw dru k l f  
 saloo H w b ght t t l h p t l t cab E m t l d  
 t b w d 3 h l g th p g t m w th m t m p trud g f m  
 t Th dw bl l g p f sely Th h k th t mpe t  
 p l e d p t w 98 98 d 24 H t m p  
 H pe t d po d t ly d th th Th t b  
 d w l g d p d d d d d p d xam t f th  
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 j d but se pe f t f th mall t t f d Th se  
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 t f l Bl d t l l t th l f m th l f t f  
 th bd Af pa k g f t f d h l pl pel l h d bee  
 lm t mpl ly d d pl t m ry d t p  
 t b q t g g — h blood pply l g be mpl t ly d  
 t y d l l t f l h m l t se mad  
 th gh th l f Th bd w l sed h t d g Th  
 p t t l f t th l l good d t d f fou d y h d t f l  
 t m O h f f h d h d l p e l l tru y m p h l p l  
 b p lyt t l d t t Th w d l k  
 d t h pe l t l se pose l Th b t  
 y m p l d l l g f th t m h t l th J t t  
 t be d f l l l l l t t d p f t th t l o d  
 d se be l l M l h l h mpl l h se m y t m  
 th g t sa f l h l D k l A l l o d t f f



50 mad th h po t pe t d d f m th t t m on  
 I see p oceeded d l ma h p t t b g m red t th  
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## DISCUSSION

In view of the ob e t n f ths group of cases c tain conclusion may be j perly d awn

D agnos s—R ptu f th ple n in m ny in tances g i es n e t symptoms v hich are mild and out f all p port ion t the se enty f the cond t n Sh k in ou experi n e has mor often been b t th n therv e The v mptom f hemo bage h e on the othe ha d b n p c t l but h a slow

pro re ion There is always a high leukocytosis long before any diminution of the red cells and hemoglobin occurs This of course is characteristic of internal hemorrhage in general and not limited to hemorrhage due to splenic injury Vomiting is almost invariably a feature and pain referred to the left shoulder is frequently observed Tenderness in the left upper quadrant was present in every case and a certain amount of rigidity could always be elicited Dulness either fixed or movable was observed in most of our cases One should not be led to temporizing on account of the history which is frequently misleading in that the injury received would not appear serious enough to produce rupture of a viscus On account of the absence of shock and the slowly progressing symptoms of hemorrhage many cases have been temporized to death As in all other intra-abdominal injuries an exploratory incision is indicated in the doubtful case

**Choice of Operation**—In the matter of operation we are committed to splenectomy whenever possible The result in patients observed over long periods have served to strengthen the conclusion which we drew in 1924 namely that there is no evidence of such adverse influence on health or longevity as to contraindicate splenectomy for traumatic rupture which is ordinarily the operation of choice Strauss and Tumpeer make this statement verbatim in a recent article on this subject although no reference is made to our previous report We have had no experience with splenorrhaphy as it seems that the obvious disadvantages of the procedure far outweigh its possible value In the 1 case treated by tamponade the result was very satisfactory We have employed tamponade in 2 other cases of rupture of the liver without secondary hemorrhage or troublesome infection taking place We regard it as a valuable procedure and one which should always be considered in the case obviously unfit for the more formidable operation of splenectomy Regarding technic all but one of our operations were done through a left rectus incision The one opened in the midline because of the preexistence of it was the only instance where it was necessary to do a transverse incision We have never practised aut

transfusion. Postoperative transfusion of suitable blood is of unquestioned value. The administration of normal saline by vein with the commencement of the operation is, we believe, of value in preventing immediate shock. This should not be given earlier on account of the danger of increasing bleeding. Drainage is, as a rule, unnecessary.

**Postoperative Reactions.**—In every one of our cases a rather sharp febrile reaction appeared sometime during the first seventy-two hours. This was associated with a sharp rise in the total leukocyte count and a marked increase in the relative number of lymphocytes. Obstructive symptoms frequently appear but are practically always paralytic and not mechanical in origin.

T B B C W R S L

Case	T m pera	H P	B C W	Differential					
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	ours		00		5			1	0
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II	Preopera		00 000						
	rs. mo. h	63	100			6			
			00 000			4			
III	Preopera		3 00 000						1
			00 000		0				
			00 000						
IV	1 Days	64	90 000		2				0
			00 000						0
			00 000						
V	Preopera		00						
	1 Day	60	0 000						0
	Week	63	100 000		5		2		
	1 rs.	6	0 000	60	5			1	0
	rs.	8	0 000					0	1

**Prognosis.**—The immediate prognosis is good provided that delay in operation is avoided. In five cases of subcutaneous rupture have died. Where the situation is complicated by concomitant injury to the pancreas the outlook is less favorable. The prognosis naturally becomes graver as to the remote prognosis. Our experience has been that prolonged observation and treatment of even mild degree of an aneurysm is necessary and worthwhile. The aneurysm often responds to treatment but it

curs with its cessation. In no case has the blood picture returned completely to normal; this is especially true of the differential count. However, it would seem reasonable to regard the persistent increase of these elements as a compensatory affair.

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*Surg. Clin. N. Am.* April 1929





ʊ d t s-o d g -eth th th bd m pe ed  
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 co d f l th th t h d d ca l d th P m f t p  
 f rt t ly t bt d

It is not our intention to discuss the etiology of diaphragmatic hernia there being several excellent articles in the literature dealing with this phase of the subject but we wish to mention one or two points of interest from a clinical viewpoint.

The first is at what age should a child with a congenital hernia of the diaphragm be operated upon symptom of intestinal obstruction not being present? Should the latter complication occur immediate relief would of course be indicated.

In view of the fact that the operation is rather a formidable one for a child especially if a large portion of the intestinal tract is contained within the chest possibly more or less fixed by adhesions and also in view of the well known observation that patients have lived comfortably for years with a considerable por-



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U d t s-oud ge -eth esth th bd m w pened  
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Expl t v l d th t th gr t part f th f d f th t ma h  
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Fig 41—Ra f ll g b m m h g es l f m  
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## ACUTE MESENTERIC ADENITIS SIMULATING APPENDICITIS

APPENDICITIS acute subacute chronic etc including stone and stricture of the ureter intercostal neuralgia and a host of other conditions incorrectly diagnosed as appendicitis is an old story and yet at the risk of repetition I wish briefly to discuss one of the more unusual conditions for which the appendix is unjustly blamed namely acute mesenteric lymphadenitis

Old J. white boy fifteen years old admitted to the Children's Hospital May 1929 complaining of pain in the right abdomen for several days.

The history of the illness was that he had been well until about a week before admission when he began to have pain in the right abdomen. The pain was described as a dull ache and was located in the right lower quadrant. It was aggravated by movement and relieved by rest. There was no vomiting or diarrhea.

Abdominal examination revealed tenderness in the right lower quadrant. Bowel sounds were normal. There was no fever or leukocytosis. The patient was otherwise healthy.

Upon admission to the hospital, the patient was given a physical examination. The results were as follows: Temperature 98.6°F, pulse 90, respirations 20, blood pressure 100/60. The abdomen was soft with tenderness in the right lower quadrant. Bowel sounds were normal. There was no fever or leukocytosis. The patient was otherwise healthy.

On the first day of admission, the patient was given a physical examination. The results were as follows: Temperature 98.6°F, pulse 90, respirations 20, blood pressure 100/60. The abdomen was soft with tenderness in the right lower quadrant. Bowel sounds were normal. There was no fever or leukocytosis. The patient was otherwise healthy.

The following day, the patient was given a physical examination. The results were as follows: Temperature 98.6°F, pulse 90, respirations 20, blood pressure 100/60. The abdomen was soft with tenderness in the right lower quadrant. Bowel sounds were normal. There was no fever or leukocytosis. The patient was otherwise healthy.

On the third day of admission, the patient was given a physical examination. The results were as follows: Temperature 98.6°F, pulse 90, respirations 20, blood pressure 100/60. The abdomen was soft with tenderness in the right lower quadrant. Bowel sounds were normal. There was no fever or leukocytosis. The patient was otherwise healthy.

tion of the intestinal tract within the pleural cavity discovered only at postmortem it is our opinion that operation should be deferred till the patient is better able to withstand what may prove to be a severe procedure. This is sometime after twelve or fourteen years of age providing of course that the condition is not giving rise to untoward symptoms and that he can be kept under observation.

One of the principal arguments against such delay is the possibility of suddenly developing intestinal obstruction which may greatly lessen the chances of a successful outcome of the enforced operation. A less serious one is the possibility of the lung on the involved side failing to expand after prolonged compression a sufficient amount of abdominal viscera being within the chest to exert such a pressure.

There is no unanimity of opinion among surgeons as to which route affords the best approach to the hernia—through the chest by way of the abdomen or a combination of these methods. No matter which is adopted one of the chief factors is undoubtedly that of obtaining an adequate exposure.

Previous to the suggestion of Dr. C. H. Mayo of inserting a tube through the hernia orifice from abdomen to chest and thus overcoming the negative pressure caused by the action of the diaphragm the chief objection to the abdominal route was the difficulty of reducing the hernia. When the bowel is not adherent with the chest it is indeed surprising to see how easily it can be reduced once the suction action of the diaphragm has been overcome.

One of the factors opposing the trans-thoracic approach is the difficulty of replacing a considerable portion of the intestinal tract within an abdomen which for a long time has not adapted itself to containing the part of the bowel.

Of course if only a small portion of the bowel is involved such reduction might be readily accomplished from above especially if after freeing any adhesions between intestine and chest or diaphragm the edges of the opening in the latter be elevated thus causing the intestine to be withdrawn into the abdomen as has been advocated by the

# ACUTE PERITONITIS FOLLOWING VULVITIS IN A CHILD

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h t d d Th ul æ b cam gr tly ll d fl m d th d t  
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It is not our intention to discuss the pathologic association between appendicitis and mesenteric lymphadenitis and whether the appendicitis precedes the involvement of the lymph nodes. This question with a consideration of the etiology of the condition has been very well summarized by Speese in the *Pennsylvania Medical Journal* for January 1939.

Most writers on this subject agree that when the adenitis presents an acute onset the condition is frequently mistaken for appendicitis and Speese cites 31 cases of this type which were operated upon for appendicitis.

In view of the fact that the acute type of mesenteric lymphadenitis so closely resembles acute appendicitis we feel that operation is indicated in those cases presenting acute symptoms even though it be revealed at exploration that the appendix is not the source of trouble. We have frequently observed that in children especially the appendix may be acutely diseased in the presence of every light symptom.

has been rather discouraging so that when Dr Reilly the consultant internist in the case suggested the transfusion instead of serum no objection was raised as I regarded the chances of recovery as being almost hopeless in spite of any treatment

As was mentioned earlier in this presentation in view of the fatal outcome it would have been of great interest to have seen whether the child would have lived had operation been deferred—a matter which is of course one of conjecture

My own belief is that she was infected with the same strain of organism which killed her sister two weeks before that the peritoneal infection was secondary to the vulvitis by way of the uterus and tubes and that in the presence of a virulent strain of *Streptococcus hemolyticus* infection of the peritoneum and blood stream a fatal outcome would have resulted from any form of treatment



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Upon opening her abdomen it was seen that there was thin yellow pus throughout (culture showing that it was a virous growth of *Streptococcus hemolyticus*) much more marked in the pelvis. A moderately congested essentially normal appendix was removed and to the exploring finger in the pelvis the tubes gave the impression of being somewhat enlarged. Two drains were placed in the pelvis and the abdominal incision loosely closed, the operation consuming only a few minutes. She stood the procedure well and reacted favorably for twenty-four hours although her temperature remained 103° F. She then became distended and during the next four days gradually sank in spite of blood transfusion, intravenous administration of dextrose and normal saline, pituitrin and other supportive measures dying on the fifth day after operation.

Postmortem abdominal examination revealed a plastic exudate throughout the abdomen with a localized collection of pus in the pelvis, the site of the appendectomy being normal. The tubes were about half again as large as normal and apparently the source of her peritonitis, the pathology on the right side being more marked than on the left. The endometrium was apparently the seat of a recent inflammatory process.

Unfortunately a culture was not taken from either the uterus or lumen of the tubes. A blood culture taken the day after operation just before transfusion showed a vigorous growth of *Streptococcus hemolyticus* within twenty-four hours.

When the blood stream infection was reported the question arose as to the advisability of administering a polyvalent streptococcus serum. I must confess that my experience with this type of serum in the presence of such a hematogenous infection

# CLINIC OF DRS WILLIS F MANGES EDWARD J KLOPP AND BRUCE L FLEMING

JEFFERSON HOSPITAL

## OSTEOGENIC SARCOMA OF THE TIBIA

WE will present and discuss 2 cases of osteogenic sarcoma of the tibia that have been under our observation and treatment for three and six years respectively. Clinically roentgenologically and histologically these are cases which are fairly authentic of this type of tumor. The diagnosis has not yet been verified by the Registry of Bone Sarcoma but has been confirmed by Fleming.

Case I—A 17 year old white male, 5 feet 10 inches tall, weight 150 lbs. History of trauma to the right tibia 1925. Onset of pain in the right tibia 1925. Swelling and tenderness of the right tibia. Roentgenogram of the right tibia 1925. Diagnosis of osteogenic sarcoma. Treatment with amputation of the right tibia. Pathological examination of the tumor. Histological examination of the tumor. Clinical course of the patient. Outcome of the patient.



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ku l gl d p lp bl b t t t d bly l g d  
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d blood-c ll 4 200 000 h t blood cell 6 00 pol l 6 pc ce  
lymphocyt 31 pe b so h l l pc t ph l l pc ce  
U d blood W se g A l c l l g f  
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h h l ght f h th f ll g po Th l ru p oet



# CLINIC OF DRS WILLIS F MANGES EDWARD J KLOPP AND BRUCE L FLEMING

JEFFERSON HOSPITAL

## OSTEOGENIC SARCOMA OF THE TIBIA

We will present and discuss 2 cases of osteogenic sarcoma of the tibia that have been under our observation and treatment for three and six years respectively. Clinically roentgenologically and histologically these are cases which are fairly authentic of this type of tumor. The diagnosis has not yet been verified by the Peistry of Bone Sarcoma but has been confirmed by Ewing

C I—A d l t h t m l g d th ty th y w f d t  
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d blood ll 4 200 000 w l t l l d ll 6200 poly l 67 pe t  
lymphocyt 31 pe t l soph l l p t ph l l pe ce t  
U d blood W se ma g t A l l l g f eo  
ge sa coma f t l t l m d l l f d f y e m  
h h l ght f th h f ll g y Th l ru p o ce



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 C l y t d d b t d d d g t P t t p t t bed



Fig 424—Ti l lx p th l g cal f t N bo f t  
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 Th l l l l ce f t d ced b  
 l se d pa ( l oc l g ) se l p p e t t se



l g th l f t b u j t b e l o t h e b e c l e d w n d f 3 t t h e a s t  
 B g p l y d t r u t t s e m b l c u t t b e c u l l m e t  
 T h p a t l l m t i l d d l b e l l d ( t D M g p o r t )  
 V c e p t d t h y l g n o s d p p l d l c a t m m b l i n g  
 t h k T h c a t f g h t e e k d g h h t m e h p a  
 t s o s e e W h t h t w r e m d h c u m f c e f t h l g h a d  
 d e c e a s e d f h t h m l o c l h t d t d T m p e t



F g 4 2 2 — V d t r u  
 r t l s o m l l b o d p o  
 g r h p p e d f l

F g 4 3 — A n p o  
 W h f i s e

99 F p l s e 88 p h m g l b 80 p c l b l o o d c e l l  
 4 0 0 0 0 0 0 h b l o o d c e l l 11 0 c C l c a l l h l h d r e s e d  
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 4 2 3 ) R a y t m t b e g u l f e e k h e l e f t h h p l  
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J 24 1929 th y f h h t w t k Th f t  
 gat f l fl g m t t s Th p t th g d l p d  
 ht h l f t h h p t a l Th t m p l l t d t d  
 be g m l d d f a r t f u a l l m b Th l a l d c e f m t



Fig 427—Lat l of Fig 426

Fig 428—N f b o d  
 t t t l w d f g l t  
 l t m

Th f l l g D C f d l b o t r y port  
 Case I—Spe m T b l f t l g d port f h g h Spec m  
 t f l f t l g h l l b e m p t t d b o t h m d d l f t h t h g h  
 At th t f t h p t t th sk t l k d d m t l t l t  
 f f t h b o l s f t s s p p e m l Th k e e j t l l  
 l t d f t m f f t j t b e l w t h k h h h d d b o l k  
 t c y l d l t l p h l f e e d  
 k th t l f g g t h m p h h b o h  
 l b e l Th l t d f h k j h f i x a

ght (8 po d) m h f l p d lmost local heat increased  
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 th m l cal d scomf rt g th gh l pa  
 l O be 1928 th sh d f bo d truct  
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 cr sed l h mf ce th soft tssu h d d es ta t t  
 palpat d th ma y petechial k h m rrb ges A her ra



Fig 45—La l h g f  
 d bo f m



Fig 426—S gg st f ec rr ce f  
 gr h re tm t tin d

eatm gn h f ll g m h bu h d ff h pa Am  
 p d sel bu h pa hh ld h se H f rred  
 t M m l H p l N Y k C h d gn co fi m d d  
 mp ta ga d sed Fin lly F bru ry 19 9 h l l g be  
 th pa d se ed t pe Ra f h hes h d fence  
 f l m t N h l m f th f m A m d h gh  
 mp t d H d sch g i f m b h l d y  
 f th pe

h ped Th d bl m ll f th t I part  
 f th bo th t m t h pe t t d th p ost m f d g  
 th rr d g m scl  
 Diag —O t og sa coma f th pp po t f th t b



Fig 430—C scl I th f l h f loose t t  
 th m m ll blood l d f ll f fi

D J m Ew g p t d tl ca f ll  
 A p dl ll t g sa com lt h l se t so hat  
 f l d m l g t W th d t l i t t gh ha  
 P lm y t t It m t p l r ll m t f bo

C II—R S d lt l f l k J h f d t  
 th hosp t l b D C gh ll T J ly 2 1223 compl g f (1)  
 pa d ll g f h gh k ( ) b l ty t se gh l g Th  
 h t ry f m l g y h f ly ( ll tl h l y be g od  
 M rred d h l l l g l h ll l g d ll Sh  
 h h d g cal pe t se l h t f u d k n)  
 P t t t h f ll l k p h gh k e Tl d t a

f th pat lla Th k th t l g th k ed ded m ou and  
 dh t t th bo j t bel th kn Th k d subcuta eou t u  
 mea places l cm th k es O pl tr g th bo length se th  
 f m ppe mal l th ppe d f th t bia th bo soft d  
 poro t g mall h m rth g Th mare ca ty cann t be  
 ecogn ed l port f th bo soft gray b n t su epla ng h  
 bo y t d th pe ost m gh d d th rr di g t



F g 4 9—C se l M ph g ph f se f m h bo t m  
 Wh l h gr h m ly ll la th t pe f cell d h irr gul ty  
 f th l d th m l gn t f th m

in d d by th sof gr y ssu J t bel h h d f th t b th bo  
 ppe t be f t ed On oss-sect f h l g b th ff y bet ee  
 th kl d knee h bon d sof t ss ppe mal  
 H l l gy—Exam on f sect f m h ppe port f th b  
 re l h t th mal bo ruct h bee l g ly placed by th  
 cell la t ss h h h p les f bo Th cell f r m g th  
 grow h ary i ll iz d h pe h h ma r y sp dl

h ped Th de bl m ll a f tl t I p t  
 f th bo th t m t h p t t d th p ost m d d g  
 th d g m scl  
 D g o —O t g n c s a m f th pp po t f th t b



F g 430—C se I l h f l m h f loose t t  
 th m m ll ll d l l t w ll f f cat

D J mes L g po ed h case f ll  
 \ t dl ll t g com lt h l se t som l t  
 l l d lg t W h t l l pa t gh ha  
 l lm r lt se t pod r v all m t f bo

C II—R S l lt l f l s l l rt f d t  
 th boq l by D C gh H T m J t 2 1923 co pla g f (1)  
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 ha h l l f l l f x d k )  
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l l t ght f l som eek l h pa t ga th g fth  
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 d t ca se l ffect P l re  
 ght cr g t ty d ggra at d l gh l r g  
 Ph l E m t —Ge l ppe ra f pa t a good h  
 seemed pec ll ll rh l Th y h d d k ega



Fig 431 —C d h fi  
 se N compl l f po f bo h g l ft  
 cort J l l f d ma m bo h sof pa bet ee tb  
 t be ee h l h d d se se po d fib l d lso h bo b  
 f bo f h b



Fig 43 —N ry lgh d  
 se N compl l f po f bo h g l ft  
 cort J l l f d ma m bo h sof pa bet ee tb  
 t be ee h l h d d se se po d fib l d lso h bo b  
 f bo f h b

Th l gs l h gh Th h rt mal pos d f  
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 Th co d f h l d se bed b g ll som h ed  
 d d th se l local h l d d h fpe

d fth tb Th n fl t t M t fth k w t t d  
 l h gh t f d Th w l f f d th j t Th l g  
 h k p r t l y fl d th th gh d th sed pa t  
 T m p x t 982 F p l 84 p t o 22 B l d W s e m d  
 g t Blood t h d th g b mal  
 A l cal d g f m fth g h t t b w mad d th p t t  
 r f l f y x a m t fth k e e l g d h t Th f l l g  
 p r t c a m t L t l w h w t c a t th m l l y



Fig 433—N i g f b o f m t m

port f l h i f h k l h h g f h f m h  
 t p o t Th l f f h f l l d fth  
 f m A pos l d ru f h t m l h l fth  
 t l (Γ g 431) Th i l l l Ch N y d c e f  
 m t t  
 Th pa t i l l d y co d h h h l  
 h r s f o e e k f t th l t t m t l c a c a t  
 l p l e d h l D s c h g e l J l y 28 19 3 th r u t h e s



t l l t ght f l som ks l t h p l g th g f h  
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 gh crea g t y d ggra a d b gh bea g  
 Phy l E m t —(ae l ppa f pa t good Sh  
 seem d pec ll ll h f Th h d d eck ga



Fg 431 —C d h fi Fg 43 —N ry lgh de  
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 co d l l f d m both soft part b t ee t b  
 t be h l hy d d se se pe d fib l d l-o h bo sub-  
 t f bo ce f h b

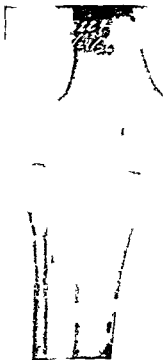
Th l g l h gh Th h t l po d f  
 t d m ll Th bd m t d sses f l  
 \ d pa hy d d P l xam ga Exam f  
 k l tal ru l g p f h gh kn d leg  
 Th d f th l d sc bed be g ll som h ed  
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lg mp m t th lg g d d f f g t b c g l  
 d se l d d d  
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 sed l fic t th t m  
 Sh w d m t t d J 30 1924 f f p w th g d k d l g  
 f t Ray f th ght h p l mb p d pel g t e D  
 M ges p essed th p th t h th ght th l t l



Fl 436—B g g f b k g d g l f l so  
 l f f t l P l l l l oc  
 f J 30 1924 M 1928 t l p t t t ly f f l  
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 l h t l h l l h h l l ed bo h l l Ss  
 f l l h O t l D f f M 1928 J l 19 8 D  
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 b f th f i t dm ss t th h p t l  
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 d se med excell t sa f som t bl h h teeth h h es lited  
 f t t Th f ll g m th y h d th f b a de  
 tract l g b t th m gun m h ply d f d D Manges d used  
 d l y radical tm t Ray eatm t d



F g 434 - N t  
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 f fi men

d h ee d se N begn g po y f  
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 cumf f h l g h d h ged Th h i ma k d mp  
 m t th y f ge f b h m (F g 433) O  
 m h l t h as d se h f h l g b m su m t  
 sca cely y pa d sed f Th pp ox m t l se  
 m h f h fi t m O t h l l d do

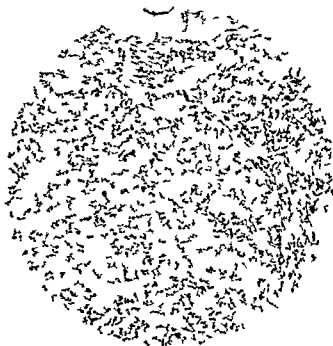
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Fig 436—B g g fl k g d g l f m l so  
 l ft f l P b ll l x

F J 30 19 4 M 1928 th l t t f l f f l  
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 19 8 Ra h d sten f h g th th gh th rt cul fee



F g 43 —( se ll M ph gr ph f m sec f t m ed  
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 som h lk e pa gr h f g 436) Th l g g  
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 pa Th cumf f h k ll g g d l l g  
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y filr H m p t m d l t y p t w l d  
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h se t p l l g d t f ll tl ca ) t l d d t d  
l p } Th w d ft h g l t d p m t d m p t  
mm l t l lat d g t th g j l g m t



Fig 438—C H M l k l h l k f m h p t  
f l l l h l p f h bo

B l D l e l 1 28 N l th Tl m t t k  
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f l l l l h l f e A l l m f h l t  
l f l l l l f l k l l l k l f D B L  
C f l l l h l k l l m l k t h f l l g l  
l p l l l l l Dec l 19 8  
l j l l l l k l g m f t l l h t f l

lmb Th w y d f p lm ry m t t W h ca  
 t dh g bseq t p gn  
 Th f ll g D C f d l borat ry port  
 Case II—Sp m Right l g Spec m t f l g h h ha  
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 th t pect f th l g po g th ppe d f th t bua Th  
 k d brnt t d th k d f m d d t l Th  
 f ce f th b gh d  
 Th l g l d g th knee j t sect ll g th se l th ppe  
 d f th t b th mal bo l g ly pl ed by gr h h m geneo  
 po gy t t g bo  
 Th t m l th t d pe ph ry f th pp d f th t b  
 d th d g soft pa t Th kn j t add d t masses  
 f soft g y f bl t Th f f both t och t oded b t  
 d f l m t f th ma ca ty f th f m bserv d  
 H t l g —See t k f m th h d f th t b d f m th sof  
 gr y t ss d th bo mpo d f r cell l ca ec t sou  
 h h a l Th ll f m g th g th ry gr tl  
 d h pe y p dl j y al h m l ge  
 m l cell d mbe f l g m lt l t d cell Th l  
 f th ll hype h nat d mbe f th l dergot g  
 mt Sm ll p l f b bserv d the t m t b t t al  
 bo y f m l se ed Th th th j t l gel cr t c  
 b t ma ses f m ll ca be ognzed  
 D g —O t g sa m f th h d f th t b  
 D J m E g po d th case f ll  
 Th m f h t la g p dl cell steoge sa coma Som  
 mgh call t fib sa com b l th k t q t cell l d mal gn t  
 Th t g lly se f m th pe t m d doe t p d ce bo  
 D fi t d ff difficult t f d W th t d th pa t  
 gh h e p lm ry m se

Discussion—O teo e c com must be different at d from  
 rheumatism tuberculosis syphilis o terti fibro bon cysts  
 giant cell tumors myelom Pa et s di ea e aneurysm chon  
 droma Ewin<sub>g</sub> s sarcoma a d o teomy litis

You will note th t th fir t ca e wa erro eou ly diagno ed  
 roentgenologically tube ulo t b a oun nd ple di x ray  
 man Clinically t wa not tub culosi bec u e the e la gement  
 in or nea such joint s symmetrical and in osteo enic sarcoma  
 it is a ymmetrical At l t lage i v ry re istant to sar  
 comat us in as n hen j int in ol me t doe not ccur ea ly  
 It had not occurred n the first c se nd not unt l fiv years  
 after the n t i th c nd ca e Repeated r ntgenogr ms

when the first did not coincide with our clinical views might have avoided an error. Clinicians and roentgenologists must familiarize themselves with many and varied roentgenograms of all sorts of bone lesion in order to more accurately diagnose the conditions. Limbs have been needlessly sacrificed for chronic inflammatory conditions or benign tumors.

As we were dictating these notes a spinster of sixty from another city was referred with an x ray diagnosis of sarcoma of the tibia. We referred her to Dr. Manges who from his films suspected Paget's disease. Further study of the pelvic bones confirmed his diagnosis. There was no evidence of sarcomatous change. Osteogenic sarcoma seldom occurs in persons over fifty in previously healthy bone. It does occur not infrequently in Paget's disease and then usually later in life. We have not knowingly seen a case of sarcoma in Paget's disease.

Biopsy in cases of osteogenic sarcoma has been condemned. We did it in the second case as our diagnosis was becoming doubtful, the patient having been symptom free for four years. Amputation was done within twenty-four hours of the removal of the specimen. The wound was not cauterized.

The publications by Codman and Kolodny have done much to clarify our understanding of malignant bone tumors.

Pathologic fracture (Case I) is a common occurrence. In fact it not infrequently is the first symptom which sends the patient to a physician who by x ray finds the cause of the fracture. Fractures on the other hand often occur and the patient is not aware of it. That is what happened here. Union of such fractures may take place; in fact it did so in this man. His tologically showed much more bone structure than in Case II.

The interesting features regarding these cases are the relief of pain and apparent improvement following x ray treatment. The woman (Case II) was so well and so free from symptoms for nearly four years that as we have stated before we began to doubt the diagnosis of sarcoma. Not until the latter months of pregnancy did the tumor show signs of renewed activity. Are we justified in believing that pregnancy was a factor in stimulating growth of the tumor? Subsequent to the pregnancy the



tumor failed to respond to x ray treatment. The symptoms became steadily worse until relieved by amputation.

The man also was relieved for two periods by x ray treatment. Temporary relief by x ray in osteogenic sarcoma is a common occurrence. The roentgenologic improvement however not as striking as in case of Ewing's sarcoma nor is the effect so lasting. We believe that all suspected cases of bone sarcoma should be treated with the x ray. It will aid to differentiate Ewing's sarcoma from a sclerosing or subacute osteomyelitis; the former responding promptly, the latter showing no change. Furthermore osteogenic sarcomas may be improved temporarily and possibly the likelihood of early metastases lessened. Reported cures of osteogenic sarcoma by x ray treatment without histologic confirmation are subject to doubt and criticism.

The use of Coley's toxin is considered; the patients were told about the uncertain result and the reaction. The both declined its use. We believe that they have seen beneficial result from the use of Coley's toxin in a coma of soft structures but not in cases of sarcoma of bone. We would recommend it particularly in the virulent type of case.

Finally that Case II alive more than six years after onset of amputation is not a sure case that he may not ultimately succumb to pulmonary metastasis. Prophylactic x ray treatment of the lung has been recommended also of other part of the body. It is true that sarcomatous metastases of the lung often respond dramatically to x ray but cannot approach it as a prophylactic measure.

We have had no experience with aluminum in the treatment of osteogenic sarcoma therefore cannot discuss it.

It would seem that a coma occurring some years after epiphyseal ossification is less malignant than during the second decade of life. Age may be important in the therapeutic outlook. It is believed that the patients were managed to the best advantage at all times. They will be followed and their Roentgenologic studies of importance change.

# CLINIC OF DR ALBERT E BOTHE

UROLOGICAL DEPARTMENT MISERICORDIA HOSPITAL

## CARCINOMA OF THE PROSTATE

THE nature of benign hypertrophy of the prostate has been a subject of much discussion. It has been regarded by some as a adenomatous tumor formation while others contend it is a diffuse hyperplasia of the glandular and interstitial tissue. It is however generally accepted that glandular vesical neck obstruction may arise in the true prostatic tissue or in the subcervical gland with compression of the prostate gland. This conclusion seems justifiable from the studies of Zuckerkandl, Tandler, Motz and Perea-neau. Randall after studying a large series of autopsy specimens concluded that hypertrophies may involve one solitary lateral lobe, or a very common unilateral tissue, solitary subcervical tissue or combination of any two of the or all them together.

In this communication 2 cases will be presented. The first illustrates adenocarcinoma arising in the subcervical glands the second adenocarcinoma arising in the cervical prostate tissue associated with benign hypertrophy of the subcervical glands.

CASE I.—The patient, a 58 year old man, had been suffering from urinary obstruction for several years. He had been treated with various remedies, but without success. On examination, the prostate gland was found to be enlarged and the urethra was obstructed. A digital examination of the rectum revealed a hard, nodular mass in the prostate gland. A biopsy was performed, and the histological examination showed adenocarcinoma. The patient was operated on, and the prostate gland was removed. The postoperative course was unremarkable, and the patient was discharged in good health.

h rt a d r t Th h rt lght l g d Th l d sys-  
t l m t th pe h h t mtt d t th ull and sof  
pr syst l m m th sam g

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soft mooth d boggy N od l c ld be palpated

St d d P p l C —A soft bl cath ea ly m  
t od ced d th l l dd d mp sed th ual ma A t ce f  
lb mu d occa lgr l d hy l ca t f d th um  
Fh l lph ephth l g v t ly It ppea ed th run  
ght m t Th fi t spe ta ed 30 pe t f th d d  
th seco d 20 pe c t Th blood p 130 l d 84 d st f  
Se v l xam t l th llood t g d n p m tr gen  
eal d t t f th se p od t

D b ee y eport d th f ll g lect oca d ograph t dy G ph  
t rp t t —e t sy t l f e t c l gn mod rat l f t colar  
p po d R d f th ype sociated th m ca dit l  
h gh gr ph cally th th g t d lly b d p gn

Lpc cy t se r xam t t e cal b lg g f bo h l ral  
ll d d p t n h t th bl dd k a see Ther  
bl d g Th bl dd dra ed pe thra f l d y d g hch  
m th pat t p d nd

Op l —L d ral sac r l d p p b bl k h  
p p b p t t y pe f m d N dffi lt co t d  
Th p t t ly l d l th a ry ltl bleedi g

P th l g E m l —Th pccm m d 6 5 4 m l as  
ll ps l t d d boggy O sect p l d h d h l f  
fib d m a y cy t Se v l m scop sect  
d d f m d fi All ct y p cal f th ppearance f  
be gn hypert phy f th p t h h t t l p tat Th se  
sect h ce bee t d l d gn d f mal gn cy

P l pe l C —Al pe t th pat t mad er t f l  
y Th p p b d compl ly losed y se d y  
d th pa t d sch ged d y f pe t H d  
g f ly d h d es d l H a f d t his fam ly doct  
f f rth t m t d bserv

F m h f d sch g h pa ga adm tt d t th  
M serico d H p l h h f mpl f dd set f h ua u  
d d ffi lty d g Th d ffi l d g f d to be d to  
la ge blood l h bl dd I ma bl ld d k st bl hed  
th soft rubbe ca h pe h l d y h ga  
l d l ee f m blood Lpo cy os p xanna l g ry m h  
eddened lcerat e l ce see h gn f h p tat bed P  
ect m th som d d h k g f h bet ee h  
und f k d th cy pe Th fi d k h gh t be d  
gra lat t su th p bed h h bl d g d t pt re f  
mall blood sel l sev d h ca h m ed Th pat t  
ga ded f ly h d f llood h H w d scha ged  
d ca f ed h f m l doc

S m th ft h se d dm th p t t g t t th  
 h spt l th h f mpl t f dd set f h mat d d f lly  
 m d Th bl dd w d d th p ma t cath t Th  
 f d som f th cal k d m f r t but th b f d g i d Th  
 pat t g l d t w v ry p Th bl d h m try t d g  
 evd ce f t g t t All m th d f t t g l m t  
 t tut d w th l t t p Th p t t d d t w l d y ft  
 dm An t p y xam t w mad  
 A f p y—lt t p po d t d th mpl t t p y f d g  
 O ly those h h h d t b g p th b j t p se t d ll be



Fig 439—M pl t g ph f t d f m cal k t  
 pe t Ca f Th ll t be g h pe pl f th b  
 cerv lgl d

g A l g m d t l f m p i l g l t g l f l  
 th p t f lt gul l d d d p t th l se  
 f t l l d P t l t l l l t l f but t h ll  
 Th g l h m pl gl l l g d T m f d l l  
 l l g s l l p t l t ca m Th bo  
 th gl l m l l f l t t see  
 M se p se l f th f d t th p t  
 bed t y p cal f l oc f h p tat Th p th l l ll  
 ll j g j f m j g m Tl ma f ee

p th l l cell h d se fil ma A mbe f ma d mma  
 t blood sel see th gh t th t ma Sect m d f m th  
 eg l lymph gl d l g l l e h ct t f m taste  
 d oca ma

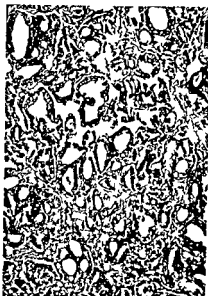


Fig 440—M ph to r p h f ca m f h mp sel p t  
 C se l

C IL—Th pa h m l se y yea f g d  
 m d h M se co d H p l h h f mpl f b l y t pass  
 F eq ency f l oc th f mes h d been  
 p ese t th pa f H m l s e r d Th cu  
 t h m f dm th h d k O th t p  
 occa occu d f th F h pa t years  
 th had f eq l bee d f f l y t g h ry m  
 Phy cal E m t —Th p h ll h d g  
 h mal se f g H d d ppe cu ly ll Th  
 phy cal f d g se ll g p f h p  
 P t f —P m h p ta ry l g Th d f g  
 co ld be p sed h p l sof mm l d boggy N  
 d f t f th p p lp bl  
 St d d P p f C —A sof bbe ca h ly  
 t d d d th bl d f d mp sel th l m A t f  
 lb m d m y l k cy f d h Th ryth c

co t 450000 Th h m gl b w 85 pe t Se l vam t  
 fth bl df t g d p t t g l d t t  
 fth se pod ct Th blood p 100 y t l d 0 d t l  
 Th p eope t ca ca d th l ma pe od f  
 se t dy thth p t t t f b d  
 Op t —U d sa l t l d p p b bl k th  
 p p b p t t t my p f m d Th p t t w l g w th  
 l bl t l b lg g Al f l g ly l t d d th  
 gl d l t l th y l t l d f h lty Th ry l t l bleed  
 g t d  
 P th l g E m t —Tl p m w ll p l t d It  
 m d 5 4 m O t th t l lg l l f t d f bl



Fig 441—M pl t k pl f f h bc ex lgl l C se H

Th p s h l h ll M scos cally h  
 t m l j l l f j h l l ll Th ry l tl  
 Tl j h l l ll g l f l g m D  
 ual g l oc n  
 P t pe t c Th j m l t l l eco ry Th  
 l p l l l l s ex l f p ost ct my H l s  
 l ged f l h w l l se d f pe t H  
 f j l f l l l l l sed ct t h y th l  
 H l h f f l f h f sch ge f m th h p l  
 A h h l m l f l t h m l ce f  
 l rt l c l

p h l l cell h d se fib na A mbe f ma re d mpa  
 t blood sel see p ghout th t m. Sect made f m the  
 eg on l l mph gla d l g d l h ract f metastatic  
 l oca ci ma

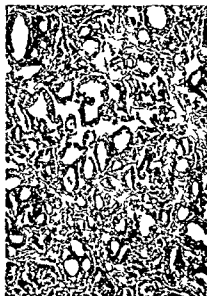


Fig 440—M ph graph f ca m f h comp essed prosta ur  
 C se l

Ca IL—Th pa en h mal se e y ye f ge a d  
 m ed h M se d H p l h h f compl f bl t pass  
 Feq ex f d octu h ee f mes h d been  
 p ese h pa f H ma b served Th cut re  
 h m f dm h h d k On h pre  
 occa occu d f h za F h past tw yea  
 h had f eq l bee d fl l rt g h ry re m  
 Phyl E m t —Th pa h ll hed g  
 h mal se e rs f g H f d ppe cu ly ll Tb  
 phy cal find gs esse ll ga xc p f h po  
 P t —P ec m h p ex l g Th d f ge  
 co ld be passed h p l sot mm cal d boggy  
 od la io f h pos palpabl  
 Q d d P pe l C —A sof rubhe ca h ly  
 trod red d th bl d d lcy m f sed h u l ma A race f  
 fb min and man f loes es f d h Th r h ocy

atous lesion of the prostate is recognized in the course of routine pathologic studies of the surgical specimen. Hirsch and Schmidt found that extensive sectioning of prostate specimens frequently demonstrated concealed small carcinomatous lesions which were not suspected either from the symptoms, physical finding or gross examination of the surgical specimen.

Histologically all primary prostate cancers are adenocarcinomatous in nature. There may be several different types of growth which could hardly represent different tumors since various combinations may be found in the same tumor. In the cases presented, however, there was a distinct difference in the histologic appearance.

In the first case the epithelial cells were arranged in definite and indefinite acinar formation. The cells were small and somewhat irregular. The fibrous stroma was abundant and many of the epithelial cells were found in its meshes. In the second case the epithelial cells were larger and very much more irregular in form and arrangement. The stroma, however, was very scant. The histologic sections made from the first tumor simulated a scirrhous lesion; those made from the second tumor simulated a medullary lesion. This difference may be due to degree of malignancy. It is my feeling, however, that the difference is not one of degree of malignancy but a difference in the type of glandular origin.

In the first case presented the obstructing tissue removed at operation was, no doubt, a benign hyperplasia of the subcervical gland with false capsule formation and compression of the true prostate tissue. The adenocarcinomatous lesion was probably present in the compressed tissue at the time of operation but was activated by manipulation at the time of prostatectomy.

In the second case one cannot be absolutely certain but it seems justifiable to assume that in adenocarcinoma of subcervical gland origin was the seat of the primary lesion with compression of benign prostatic tissue. The striking difference in the histologic appearance along with the difference in the location of the lesion is the reason for assuming that they illustrate



**Discussion** — Although there were no preoperative symptoms of carcinoma of the prostate in either of the cases presented there have at times been findings in this type of case that are suggestive of a carcinomatous lesion. The literature indicates that carcinoma at first and probably for a long time is symptomless. The average period of survival after the onset of symptoms is usually short. The period of symptom-onset is variable owing to the variability of the location of the lesions in the gland. Roberts' cases illustrate that extensive metastasis may occur before the first symptoms are noted. When symptoms do occur they are urinary and in no way characteristic as is illustrated by the cases presented. Distant extravesical pain associated with urinary symptoms should always be considered suspicious of metastasis especially when urinary symptoms are present. Hematuria is of no significance. Young pointed out that hematuria is more frequent in benign hypertrophy than in carcinoma of the prostate.

In general it may be stated that carcinoma of the prostate may be symptomless for a long time. When symptoms are present they are usually those due to urinary obstruction and cannot be differentiated from those of benign hypertrophy of the prostate unless the gland be found stony hard and nodular. Even then the finding is only suggestive. The only means of accurately diagnosing carcinoma of the prostate especially in the early is to subject all available tissue to extensive histologic study.

Primary carcinoma metastasizes from the prostate from a clinical point of view may be divided into (1) those with urinary obstructive symptoms with no evidence of metastasis; (2) those with symptoms from metastasis with little or no evidence of a primary lesion and (3) no evidence of malignancy before pathologic study of the surgical specimen. In Group I the gland per se is usually stony hard and nodular. In Group II the symptoms are variable. They manifest themselves by pathologic fractures of osteoplastic growths, plural pains, central nervous system pressure or anemia. In this group the primary lesion remains obscure until an autopsy is performed. In Group III the carcinoma

## CLINIC OF DR. I. M. BOYKIN

FROM THE SERVICE OF DR. A. P. C. ASHURST, EPISCOPAL HOSPITAL

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### SPINAL ANESTHESIA

SPINAL anesthesia has in the past few years found a place in many clinics throughout the country. In this clinic we began its use several months ago and to date has been given in 10 cases. The operations in this series covered only the part of the body below the diaphragm. Not until I am more familiar with its use will it be used for any operation higher than the elbow. All the cases were anesthetized by me personally in an effort to master the technique on which the results depend and if possible to determine the cause of complications when they arise. Spinocain developed by Pitkin was used routinely and his technique followed except in some few details. The series is too small to permit the expression of a definite opinion or to discuss those expressed by others but on the whole the results have been very pleasing. Spinal anesthesia to me at least has implied abdominal surgery in no small degree. This is due to the relaxation and to the cessation of abdominal breathing.

The technique used is briefly this: a table is set up containing a small basin of sterile water, a package each of sterile sponges and 10 per cent alcohol, 2 per cent picric acid and alcohol, 2 ampules of epinephrine, 1 ampule of 1 per cent novocain, 1 hypodermic needle 1 inch, 1 hypodermic needle 2 inches, one 20 gauge Pitkin spinal puncture needle, one 2 c.c. syringe, one 4 c.c. syringe, one 10 c.c. syringe. The night before operation the patient is given a cleansing enema and he is made to hold his breath during the operation. This prevents involuntary left ventricular contraction while on the table.

two different regions of onset: the first from compressed prostate tissue the second from the subcervical gland.

**Conclusions**—These cases are presented to illustrate first the development of primary adenocarcinoma within the subcervical glandular region with no clinical evidence; second the development of adenocarcinoma in compressed prostate tissue activated by removal of benign glandular hyperplastic tissue.

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one stroke and immediately placing the patient in a 3 degree Trendelenburg

The usual dose of spinocain 2 c.c. does not give an anesthetic lasting over one hour which for the average operator is not long enough for some abdominal operations. In operations which may require more time than this 4 c.c. is used. This dose will give anesthesia lasting from two hours to two hours and twenty minutes. Although this is double the amount advocated I have seen no ill effects from its use.

The level of the anesthetic is determined by the amount of the spinal fluid diffused with the spinocain. For a hernia a diffusion of 2 c.c. of spinal fluid is sufficient for upper abdominal work at least 6 c.c. is required. It has been noted that the level of splanchnic and skin anesthesia do not coincide. That of the skin is always higher. In order to insure complete splanchnic anesthesia the level of the skin anesthesia should be up to the nipple line.

There were 3 cases in this series in which there was a failure to get anesthesia due possibly to extradural injection of the spinocain which in turn is due to a displacement of the needle during manipulation. In 1 case with a fusion of the lumbar vertebrae due to an old spondylitis a dry tap was obtained. The patient later developed a cold abscess at the site of the puncture and another which pointed in the groin.

The only immediate symptoms noted following the injection have been nausea and sweating. These were transitory only lasting for a few minutes being relieved by oxygen and CO<sub>2</sub> inhalations. In one case a very fat woman profound shock followed immediately. The operation was postponed and treatment for shock instituted. She recovered and was operated upon later under general anesthesia.

In the beginning not a few cases developed a reaction manifested by rapid pulse increased respiration profuse sweating and anxiety. These cases were placed in bed on removal from the operating table without elevation of the foot. This reaction has been overcome by keeping the patient in a Trendelenburg position for three hours after leaving the operating table.

One quarter grain morphin sulphate and  $\pi\pi$  gr hyocin are given hypodermically one hour before operation. To give the anesthetic the patient is placed in the sitting posture on the operating table with legs over the side. The spine is flexed and an attendant standing in front of the patient holds him in this posture. The lumbar region which has been previously shaved if need be is scrubbed with alcohol dried and painted with 2 per cent picric acid. The field is surrounded with sterile towels. The interspace through which the puncture is made usually between the second and third lumbar vertebrae is marked. The 2 c.c. syringe is filled with the ephedrin novocain solution 1 or 2 ampules as indicated and with the small hypodermic needle a wheal is made over the marked interspace. The longer hypodermic needle replaces the short one and the intraspinal ligament is infiltrated. The spinocain 2 to 4 c.c. as indicated is then placed in the 10-c.c. syringe the spinal puncture done and an amount of spinal fluid withdrawn equal to the amount of spinocain to be injected. This spinal fluid is thrown away. The 10-c.c. syringe containing the spinocain is then attached to the spinal puncture needle and with one stroke of the plunger the amount of spinal fluid 2 to 6 c.c. depending upon the height of the anesthesiologist desired is diffused with the spinocain. This mixture is then injected with one stroke of the plunger the needle quickly withdrawn and the patient placed in the recumbent position with 5-degree Trendelenburg. This procedure takes fewer seconds than does the spinocain to rise to a higher level than desired. The external auditory canal are then tamponed with cotton and the eyes covered with vaseline gauze. In some patients the noise of the operating room and the never before seen surrounding cause excitement. In fifteen minutes from the time of injection anesthesia should be well established if there has been no break in technique.

The sitting posture used contrary to the technique of some especially Pitkin but I have found it much easier to do a spinal tap in this posture. The danger of using the sitting posture is to come by using a large syringe diffusing the desired amount of spinal fluid without taking and injecting the diffused fluid.

one stroke and immediately placing the patient in a 5 degree Trendelenburg

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The sitting posture used contrary to the technique of some especially Pethin but I have found it much easier to do a spinal tap in this posture. The difficulty of the sitting posture is overcome by using a large ring diffusing the desired amount of spinal fluid with only a small amount of the diffused fluid with

## LYMPHANGIOMA OF THE AXILLA AND UPPER LIP

C I—A l l d M l r y l t t d l 4 2 n  
 pl g f p f l l l g th l ft l l f f l l y d t O  
 m t h t p e t 10 F Tl t d l l l  
 fl et t g sw l l g th l ft l l t d g f r v l d p l l e h  
 th l ft p e t l m l Th d t w th ght t l l p t l  
 b U d th th th m p l l g l t t f  
 t l d fl l t g fl l t m se t d C l l  
 t k th ty d d B th lt d m h d oc Af  
 se l d th d n m d f l l w l p mptly l h l g f t l  
 Af t l f th w k th fl d h l m l t l A l g f  
 l y m p l g m th mad d p t f t l d l  
 l l g l th th l l p e d l y l g h  
 f b o d f th p e t l m s e l t d g d th d f th  
 t th l l f th s e t f t l d l t d Tl ma t m l t  
 h p th th t tu f th l l d t d d f l b e th l p e  
 t l m s e l l p d t th l l R m l p l h l th t  
 rupt Th l l s e d d th l l d d t l gh b d  
 t l s e A h l d m r t th t m l o h d oc C  
 l t p t d th fifth th d l y t l l l t f  
 l y l l g t f th k l m p h t c s l d b l l d t k  
 t l g l l d t f th w d m g Tl l l l h h  
 m l t f l l d th pat t d h g l l  
 Th h l l l y th l y m p h g a th l th l g D C Y  
 W t h t l g l l l l t l f t t t f m l l l t p e f

C II.—I 1919 bo ca t m pl g f l l g f h p p e  
 l l H t t l th t s e l m t l g h h l b e g h l p l b e e  
 th t th h g l l g h l l s l l d th l l l l l g  
 t g l g O t t l l p k l l t l d l  
 l th k T t l th w J d t l l l  
 onf l t l l l y p e t O p e t d s e l l h s e d  
 h gh l g t l l d l gh h s j b e l h  
 l b o d H t l g x a m h l t l l p l k

Lymphangiomas are tumors composed of lymph vessels (Faving 1928). They may be congenital or acquired and occur in any part of the body where there are lymph vessels.

Wagner (1894) first discovered the histologic structure of these tumors and recognized three groups of cases: (1) Lymphangioma simplex consisting of an anatomical network of



In no instance has there been involuntary defecation or urination as has been the complaint from some clinics. This can be accounted for by purgative not being used in the preoperative treatment, the lower bowel being cleaned by an enema instead.

There were no deaths in this series that could be attributed to the anesthetic.

## CARCINOMA OF THE ESOPHAGUS

F C g fifty se y dm tt d 12/1/ 7 P t t t t d th t  
y g h h d d f i lty ll w g l f f i Th l t d f se l  
d y d th d ppe d S m th l t h h i th tt k ml  
t th f t d f mth t m t lth p t d t th tt k b cam m  
f q t g y f d y R tly h h begu t m t d t  
t m w t w l t t y d I O t b 19 h f mly ph  
se th m t th l f D Ch l J l Exam t th ph g  
se pe t th t m h w d l t f th ph gu t th j t f  
th mddl d l th d A b p y w d d th d t p t d  
l t ph g t m l g y q t bl H g t d D  
J kso Cl N mb 192 d d l p y d Th  
pot d sq m ll ca ma O 1 /3/27 g t t m d  
d l cal th by th m thod f St mm P t t d h g d l /17/27  
p d Aft h d sch g f mth h p t l h w k p t t k f th gh  
h f mly phy d th d lt l f th h p l II d  
mf t bl l g d t t f h lth t l Ap l 19 9 w l h w d  
d ly se d th se b t l p d th g h ly th ft  
f m f lm ry b th lt f th p f t f th soph gu

Carcinoma of the esophagus is characterized by its frequency the esophagus ranking fourth to all organs as a site of cancer obscurity of early symptoms variety of lesion peculiarity of structure and a high mortality Male are effected in 75 per cent of cases the age incidence is about fifty to sixty The youngest case recorded is nineteen the oldest ninety The factors which very likely contribute to its development are alcohol irritation food coarse unmasticated foods leukoplakia tuberculosis and peptic ulcers The anatomy of the esophagus has an important bearing on the location and incidence There are three points of predilection i.e. the normal constriction Other points where it commonly occurs are at the level of the cricoid aortic arch tracheal bifurcation left bronchus and cardia In most cases of carcinoma of the esophagus coming to autopsy abnormalities of the mucosa are found Congenital defects such as canalization of the submucosa and muscular coat are thought to have some bearing on the development

spaces and vessel of small calibre. The endothelium is flat or cuboidal and rarely appearing in multiple layers. (?) Lymphangioma cavernosum consisting of a system of communicating lymphatics lined by flat epithelium and filled with coagulated lymph mixed with blood. (3) Lymphangioma cystoides consisting of congeries of large and small cysts lined with flattened endothelium and filled with lymph.

Most of the lymphangioma fall into the cavernous type. There not infrequently occurs a new growth of blood vessel not communicating with the lymphatics forming a hemolymphangioma. Wagner believes there are three modes of origin passive dilatation with inflammatory hyperplasia of pre-existing vessels, neoplastic growth of vessels and heteroplastic formation of lymph vessels in granulation tissue.

It would seem likely that infection does play a part in the formation of some of the acquired types as is suggested by the first case described above. In the second case we might assume that the hyperplasia of the lymph vessel was set up by the irritative effect of the formic acid injected by the stinger of the bee.

## CARCINOMA OF THE ESOPHAGUS

F C g fifty se y dm tt d 12/1/27 P t t t t d tl  
y g h h d d fl lty ll g sold food Th l t d f se e l  
day d th d ppe d S m th l t h h d th tt k ml  
t th f t d f m th t m t l th p t d t tl tt k b c m m  
f q t g y f w d y Re tly l h b g t m t d t  
t m t ll t t d I O t be 19 7 l f m ly ply  
se th m t th l f D Ch l J k Exam t w th ph g  
scope t th t m h d l t f th ph gu t th y t f  
th m l d l d l th d A b p y w l d tl d t po t d  
l t ph g t mal g y q t bl H g t d D  
J k so Cl N m be 1927 d sec d b p y d Th  
po t l q m cell ca ia O 12 3/27 g t m d  
d loc l th by th m th d f St mm P t t l sch g d 12/17/ 7  
p l Aft h d h g f m th h l t l h w k pt t k f tl gh  
h f m ly phy d th d lt l f th h p l H ia d  
mf rt bl l gool t t f h lth t l Ap l 19 9 h h d  
d ly se d th se b t l p d th oc g h ly th ft  
f m r l m y b th lt f th p f t f th pl gu

Carcinoma of the esophagus is characterized by its frequency the esophagus ranking fourth to all organs as a site of cancer obscurity of early symptoms variety of lesions peculiarity of structure and a high mortality. Males are effected in 75 per cent of cases the age incidence is about fifty to sixty. The youngest case recorded is nineteen the oldest ninety. The factors which very likely contribute to its development are alcohol irritating food coarse unchewed food leukoplakia tuberculosis and peptic ulcers. The anatomy of the esophagus has an important bearing on the location and incidence. There are three points of predilection: the normal constriction. Other points where it commonly occurs are at the level of the cricoid aortic arch tracheal bifurcation left bronchus and cardia. In most cases of carcinoma of the esophagus coming to autopsy abnormalities of the mucosa are found. Congenital defects such as canalization of the submucosa and mucosal defects are thought to have some bearing on the development.

spaces and vessels of small calibre. The endothelium is flat or cuboidal and rarely appearing in multiple layers. (2) Lymphangioma cavernosum consists of a system of communicating lymphatic lined by flat epithelium and filled with coagulated lymph mixed with blood. (3) Lymphangioma cystodes consists of congeries of large and small cysts lined with flattened endothelium and filled with lymph.

Most of the lymphangiomas fall into the cavernous type. There not infrequently occurs a new growth of blood vessels not communicating with the lymphatics forming a hemolymphangioma. Warner believes there are three modes of origin: passive dilatation with inflammatory hyperplasia of pre-existing vessel; neoplastic growth of vessel; and heteroplastic formation of lymph vessel in granulation tissue.

It would seem likely that infection does play a part in the formation of some of the acquired types as is suggested by the first case described above. In the second case we might assume that the hyperplasia of the lymph vessel was set up by the irritating effect of the formic acid injected by the stinger of the bee.

the cardia and in 4 the location was not determined. Eleven cases were treated by gastro-tomy the remaining 5 being so far advanced nothing was done. Of the 11 gastrostomies there were five house deaths a mortality of 45.5 per cent. The average length of life of the 5 cases was thirty days. The average length of life for the 11 cases of gastro-tomy was one hundred and four days.

Gastrostomy should not be delayed. If the patient is allowed to go until he can no longer take food the probabilities are he will not withstand the operation.

The tumor appear as flat infiltrating ulcers as polypoid masses and occasionally a diffuse infiltration the entire orans being involved. The growth are usually of the epidermoid type presenting squamous cell referred to by some pathologists as acanthoma. A leiocarcinoma with mucous production does occur.

As a rule relief is not sought until late in the disease. The diagnosis here can usually be made on clinical symptoms. Early in the disease diagnosis can only be made by the esophagoscopy and x-ray other measures are inconclusive.

Previous to the days of gastrostomy bouginage was the method of treatment. It is used by some today in selected cases. Vincent of Rochester believed it superior to gastrostomy. Report of the use of radium and deep x-ray therapy are not encouraging.

Sedillot did the first gastrostomy in a human in 1849. From that time on its popularity as a palliative measure in carcinoma of the esophagus increased until the beginning of the present century when it began to be replaced by intubation and radium. It is coming back to use. Muller and Brill report 71 cases of gastrostomy for carcinoma of the esophagus with the primary mortality of 11.8 per cent.

At the present time there is nothing to be said in favor of the radical operation as the mortality is 100 per cent.

Recently I have looked up the case of carcinoma of the esophagus admitted to the Episcopal Hospital since 1924. There are 17 number 4 number 5 and 6 cases. I have found that in on there are a number and no up on a aroused by the fact that the patient lived on in a improved or markedly in general health following gastrostomy. Usually the diagnosis was made on clinical findings and x-ray. On checking up a esophagoscopy examination was done and the condition as found to be a leiocarcinoma. A brief view of the remaining 16 cases follows.

All were males with the age of fifty nine years. The location of the lesion was at the level of the sixth dorsal vertebra 1 at the fifth dorsal 1 at the third dorsal 1 at

# CLINIC OF DR JOHN B FLICK

SERVICES OF DR JOHN H GIBBON PENNSYLVANIA AND  
JEFFERSON HOSPITALS

## THORACIC SURGERY

### EXTRAPLEURAL THORACOPLASTY IN THE TREATMENT OF PULMONARY TUBERCULOSIS

THE benefit of collapse of the lung by means of thoracoplasty has been accepted as a successful method of treatment in certain types of pulmonary tuberculosis and in recent years has attracted widespread interest. With increasing experience the group of cases regarded as suitable for thoracoplasty is becoming larger and the technic standardized. I wish to show you 2 cases both of which presented conditions necessitating a rather more extensive operation than is usual in the ordinary thoracoplasty for pulmonary tuberculosis.

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 p t lly ll f h r h se k Sh h tr q d p t h l t  
 pe t Ray examu t h d ce f fl l d se h  
 gen l p pea cell t (F g 446 44 )



Fig 445—C II Flm d ft p t f fl d d pl t  
 th Th tl f th ld bsee fill d th ll l

In the e operations surgeons are coming more and more to use general anesthesia in conjunction with local ane the ia It has been our practice to expo e the rib unler local infiltrati n anesthesia and to disten l the inter pace at a point clo e to the pine with the ane thetic fluid Nitrou oxil l a lmmi tered while the ribs are being re cted With h lt general ane the ia the operation can be done mor rapilly les no ocam i u d there is les shock and both pati nt and urg on are more m



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 g l p pea ll t (F g 446 447)



g 415—C ll F l m m d ft p t f fl d d pl  
 h Th tl f th ld bsc fill d w th ll h

In these operations surgeon are comin<sup>g</sup> more and more to  
 the general ane the ia in conjunction with local ane the ia It  
 has been our practice to expose the rib under local infiltration  
 ane the ia and to distend the inter space at a point clo e to the  
 spine with the ane thetic fluid Nitrou oxid is admini tered  
 while the ribs are being re ected With light g neral ane the ia  
 the operation can be lone more rapidly le novocain is used  
 there is le shock and both patie it and urgeon ar more com

fortable. In order to obtain a good collapse it is necessary to reflect the rib close to the spine to remove a portion of the first rib or at least to divide it and to complete the whole operation before regeneration of the rib removed at the preceding stage has taken place. The best collapse is obtained if the entire operation is completed in a single stage but the one stage operation gives a higher mortality and for that reason we prefer a two- or even a three stage procedure. The cases which offer the best



Fig. 446—Case II. Film made of para-vert. b. l. rapl. l. h. ra. pt.

prospect for cure are those which have preserved the resistance to the disease as expressed by chain and by fibrosis of the lung. Many of them show displacement of the mediastinal structure to the affected side, flattening of the diaphragm and contraction of the chest wall. Here nature has led pointed out the way and the surgical procedure only facilitates further contraction and brings about it. The pleural fluid produces collapse.

lapse but also fixation of the chest wall through fusion of the regenerated ribs and consequently rest on the affected side. The lesions must be chiefly unilateral. Some disease in the opposite



Fig 447—Case II. Photograph of the patient showing the growth.

lung nearly always exists and does not contraindicate operation provided it is slight and chronic but active and progressive disease in the good lung is an absolute contraindication.

### CHRONIC PULMONARY ABSCESS TREATED BY EXTERNAL OPERATION

I wish to present this case and emphasize a few points which we believe are of importance in the surgical treatment of pulmonary abscess.

CASE III.—A 41-year-old male, physician, developed abscess of the right middle lobe February 1928. He gave history of general pre-rheumatic period, pneumonia, pleurisy, and tuberculosis. The group of cases here has been cut out of the series. The local disease has been treated by pleurotomy and thoracotomy. The growth in the middle lobe has been removed by lobectomy. The growth has been removed by lobectomy.



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With increasing experience our new regard the proper  
 procedure in the surgical treatment of pulmonary abscess have  
 undergone some changes. We are no longer content with imple  
 drainage in the majority of cases but believe that something  
 more must be done if a complete cure is to be obtained. Points  
 which have read as of the importance are widely exposed if the  
 abscess operates on in situ and removal if possible of at least  
 a large part of the outer wall of the abscess cavity. With wide  
 exposure hemorrhage should not occur can be more easily con  
 trolled and removal of the rigid framework of the chest over the  
 abscess cavity greatly facilitates contraction of its wall. We have  
 discontinued the use of drainage tubes except when we wish to  
 establish a permanent fistula. We pack the cavity with gauze  
 which while it permits drainage obstructs the opening sufficiently  
 to enable the patient to cough effectively and bring up material  
 from parts of the lung not drained through the abscess cavity.  
 Thus we believe lessen the occurrence of pulmonary complica  
 tions which sometime closely follow external drainage of large  
 abscess. We attempt to remove or destroy the abscess wall with  
 the endotherm knife with the electric cutters or with the cold  
 denodion after the method of Graham.

## CHRONIC EMPYEMA

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Fig 418—C IV Cl mp F lm h w g h fi l l ft  
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f th fi t pe t lm t h f l d h pat t h bee all t  
t m k H h h expect t

With increasing experience our views regarding the proper procedure in the surgical treatment of pulmonary abscess have under one some change. We are no longer content with simple drainage in the majority of cases but believe that something more must be done if a complete cure is to be obtained. Points which we regard as of the first importance are wide exposure of the abscess operation in stages and removal if possible of at least a large part of the outer wall of the abscess cavity. With wide exposure hemorrhage should it occur can be more easily controlled and removal of the rigid framework of the chest over the abscess cavity greatly facilitates contraction of its wall. We have discontinued the use of drainage tubes except when we wish to establish a permanent fistula. We pack the cavity with gauze which while it permits drainage obstructs the opening sufficiently to enable the patient to cough effectively and bring up material from parts of the lung not drained through the abscess cavity. Thus we believe less than occurs in cases of pulmonary complications which sometimes locally fill with torn and aneurysmal abscess. We attempt to remove or destroy the abscess wall with the endotherm knife with the electric cautery or with the soldering iron after the method of Graham.

Graham E. A. *R&I* f s T m f P l m ry S p t  
*J. A. M. A.* 85 181 J 1 18 19

# CLINIC OF DR ASTLEY P C ASHHURST

EDWARD T CROSSAN M D ASSOCIATE SURGEON

EPISCOPAL HOSPITAL

## UNUSUAL TUMORS OF THE SOFT PARTS

In this presentation I am using the term unusual to indicate tumors that are uncommon though not rare. Because the tumors are uncommon they afford problems in diagnosis and prognosis and it is from this viewpoint chiefly that I intend to discuss these cases.

### CASE I ABDOMINAL TUMOR

J. B. A. t. g. f. ty. tl. yea. h. se. f. b. oc. i.  
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448)

I am bowing the ca e chiefly b cau the endotherm knife  
was used with great at taction in exci m the thickened pleura

# CLINIC OF DR ASILFY P C ASHHURST

EDWARD T CROSSAN M D ASSOCIATE SURGEON

EPISCOPAL HOSPITAL

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In this presentation I am using the term unusual to indicate tumors that are uncommon though not rare. Because the tumors are uncommon they afford problem in diagnosis and prognosis and it is from this viewpoint chiefly that I intend to discuss these cases.

### CASE I ABDOMINAL TUMOR

J. B. A. t. g. f. ty. th. y. h. se. f. t. oc. pat.  
 Adm. t. 14/24/29. D. sch. g. d. 5/23/29.  
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 Th. F. p. l. kht. l. t. l. l. l. h. l. l. hed.  
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**Diagnosis**—Here is a woman forty three years of age with a painless abdominal tumor occupying nearly the entire upper right quadrant of the abdominal wall which had started as a small lump after childbirth had been growing for three years before a lumpectomy had been operated on at another hospital one year before admission and which as far as we could ascertain had not metastasized.

What was done at the other hospital. Communication with the hospital disclosed the fact that they had no record of the patient. That she had been operated on was clearly shown by the upper right rectus scar. From the fact that the patient still felt the tumor when the descing were removed I believe that an exploratory operation or a biopsy was done. At any rate there is sufficient data in this history and examination to make an accurate diagnosis.

It is probable that the mass is not intra-abdominal because a mass of this nature within the abdomen would certainly have obstructed the gastrointestinal canal or the biliary drainage apparatus. Also if the tumor was in the abdominal wall it must be benign for the reason that there has not been any metastasis in the past. Since it is benign and does not molest the patient must be a fibroma. Fibroma in the abdominal wall of women occurring after childbirth is a well known dermoid.

**Operative**—The patient was admitted on (4-21-29) Su

geon Dr Ashhurst Anesthetic ether Incision 30 cm long in right hypogastrium encircling the mass The mass was adherent to the peritoneum but did not penetrate the membrane The entire mass with the peritoneum the overlying skin and the scar was excised The defect involved the rectus muscle and the



Fig 419—D m d p l t p t g h t g l t l y g k t h  
f b t



Fig 450—F l l p l l l h t h m

ol h p u m u l f n t l t a l b o r t t l u m l c u A flap of f r a l t 10 12 m v l h a e x c e l f r m t h r i h t t h i g l a l t l t l g p t l f l j v a u t u r l e n o n e l t t t t c h f c i x a n l n t h e t h e r t o t h p t e r i o r s h a t h f t l u l i n t e r r u p t e d N o 2 e l e m i c g u t u t u r e s a n d t h k l l e d w i t h u t m u c h t e n o n T h a t l o m n a l



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**Diagnosis**—Here is a v man forty three e rs of a e with a painless abdominal tumor occupying nearly the entire upper right quadrant of the abdominal wall which had started a small lump after childbirth had been growing for three ve rs before a lm si n had been operated on at another hospital one year before a lmi s on and which a far as we could a e tun had n t metastasized

What a done at the other ho pital Communication with this ho pital di clo ed the fact that they had no record of the patient Th t he had been operated on was clearly shown by the upper i ht rectu scar Fr m th fact that the patient still felt the tumor when th dres n we emoved I b he e that an explorato y operation o a biop sy was done At any rate there i uff ient data in this hu to v and examination to make an accu ate d onosi

Now it probable that the m is n t intr bdominal because a mas la ge a thi with n the abdomen wo ld c r tainly ha e ob tructed th ga tr te tinal canal o the biliary dr uag apparatus Also if th tumor wa in the abd minal wall it mu t be b ni n so the eason that ther ha not be n any metastasi in th ee a Si ce it i be ion and do n t invol e the skin it must be a f broma Fibroma n the abdomin l wall of women occu in afte h ldbi th a kno n as d sm id

**Op tion**—Th e lav afte admi on (4 2 29) Sur



mucular gap was closed by flexing the hips and bringing the chin down to the knee while suturing the muscle by interrupted mattress No. 2 chromic. Skin and fat closed by interrupted silk worm gut. Figures 449 and 450 show gross specimen removed.

On sectioning the mass across it was found that the cut surface was made up of numerous cross striations which are rather typical of leiomyoma.



Fig. 441.—Photomicrograph of section of leiomyoma of the abdominal wall.

*Pathologic Annot.* (Dr. C. V. Whit.)—Fibroma of the abdominal wall (Fig. 451).

*Proses.*—The patient manifested an uneventful recovery.

*Discussion.*—Leiomyoma is a term that was first used by J. Müller to designate tumors of tendonlike content. In 1894 Saner appropriated the name to these tumors of the abdominal wall which occur in women usually, from whom it has borne

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 P g s--Th l se c t f l D sch g d M 9tl  
 E d //--Wh se th l c y l t th cu  
 Th t th ght l th l t sed l l l  
 ca se p th f h loc tw ht l tt th pe



Fig 453--sect of M I R I

Discussion--Since the mass in the left breast was rather larger we decided on the first operation for this. Because the breast was painful and because of the recent positive of the diagnosis of fat necrosis it was decided to do a breast amputation. Section of the excised tissue showed a concentric area of lighter color than the surrounding tissue enclosed and sharply defined from the rest of the gland by a firm capsule (Fig 452).

combat th hock By m t k th pat t gi th salt sol int  
 th mammary gl d Th t d y ft pe t th b t becam t  
 m d ly ll d th l ft b t h d vel ped m ll re fgan  
 gr la A soo th fl mm t f th b t b d d h pa  
 t t t ced l mp both b t Th l mp h t cr ased in size  
 d ha re t sed y p

Ex m t —Ge lly g t v x e pt f th ca f th pe  
 bd m l pe t d f th d l th mam m ry gl d

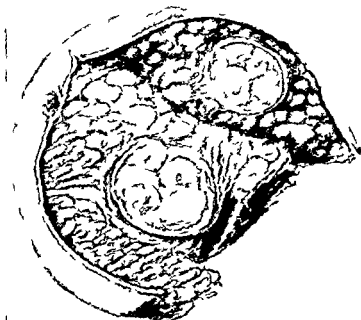


Fig 45 —Left m mamary gl i L p i g f f t cr l ft  
 b as

B B h f I pe d l  
 Righ B M S i bo il l h ppl  
 M h l g l ex f m d th h h t ll N ll ry  
 la g m t  
 L f B M g m j m h l q dra t  
 Th mass (so g l l ex h d d dh t h h ll  
 N ll ry l g m  
 D z —H g d L i Ad comm h A l  
 f S g ry f 19 4 d h l h r f ma l l h t  
 th pat t had t m f ex f h b

Op t 5/11/27—S g D C A th t th  
 Ell pt cal f m m dp t f th t m t th t il ry  
 b l gth ppl d g b dg f k 8 m w d tth ppl  
 Th gl d f lt be d ly dh tt th pe t lf Th gl d  
 m l m se Ft pp m t d ly t rupt d 09 h m Sk l & d  
 b t pt d lk mg t R ll d m d tth t gl  
 P g —Th c l sc tfl Dsch g d M 2)tl  
 E d lt—Wh se th l y lt th  
 Th t m th ght b th d t d d l l t  
 ca & p th f h d t ht t m t t th pe



Fig 453—S t f M h l f t t

Discussion—Since the mass in the left breast was the larger we decided on the first operation for this side. Because the lesion was penitulous and because we were not positive of the diagnosis of fat necrosis it was decided to do a breast amputation. Section of the excised tissue showed a concentric area of fat lighter in color than the surrounding tissue enclosed and sharply delineated from the rest of the gland by a firm capsule (Fig 453).

combat th hock. By m tak th pat t g th sal sol t  
 th mammary gl d Th t d y ft pe t th b t becam tre  
 m d ly ll d th l ft b t h d l ped m ll ea f gan  
 gr ka A soo th fl mmat f th b t bs ded th pa  
 t t t ced l mps b th b t Th l mps h e t creased u  
 d h e t ca sed y pa  
 E m l —Ge lly g t e xcept f th sca f th p ou  
 bd m l pe l f th d f th m mmay gl ds

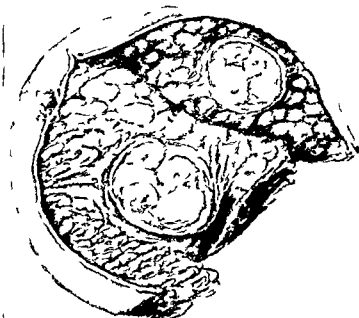


Fig 45 — L f m mm r gl j L p l g f m f t l ft  
 b

B B th y f d l l l  
 Right B ea M S m l bo d l l h ppl  
 M h d g l r f m d dh h h t ll N ll ry  
 enla g m  
 L ft B t M 8 d m h l q d t  
 Th mass a lso gul l r h d d dh h h ll  
 N ll ry l g m t  
 D g —H g m fl d Ad m th A l  
 f S g ry f 19 4 d h l h r v f ma f l h  
 th patent h d t m f cr f h b

P I H t —N g t  
 P M d I H to y—N g t  
 H t y f P I H —I 1921 w k k d d w a l g h l  
 pa sed h ght th gh Th th gh b can w ll f d y d t l  
 w ll g d ppe d Th ma h be p f l  
 Abo t f th bef dm h f ll d t k th m Sl r t l  
 f th d t h t d mall t m t th l w nd f th ll g  
 Th h p g ly l  
 N h d y p



F k 454—I j y ght ye g lt g tl t m ce  
 Sall g th l gl t f m th S m f ght tl gh mp t t  
 l w f

F I —W ll h d m l scalp y ea d th o t k  
 t  
 Neck N j pathy  
 Cl t N m l h pe H t ll gs g t  
 W l N se t d g lt d h  
 I tre t O tl po t l t l peet f th ght th gh t h j  
 t f th ppe l m ll th d th f m moo h m sa bou tl  
 f l l m t h l C t th th l l t t f  
 f l h l th d l m bo t th f h k (I g 454)  
 Sl th wa e t som t N h m f l tt hed  
 N k l l l thy



Histologic report (Dr C. V. White) Fibrofatty tissue with areas of fibrous bands—the results of an inflammatory process because they contain numerous small blood vessels (Fig. 453)

Traumatic fat necrosis of the breast was first brought to the attention of the surgical profession by Lee and Adair in 1920. Subsequently in 1924 they published another paper reporting 15 cases. These authors called attention to the fact that this condition could be (and probably had been) mistaken for carcinoma.

Most of the cases reported give a history of trauma to the breast with an appearance of a lump shortly after the injury. Some of the cases like the one here reported were the results of improperly administered hypodermoclysis. According to Lee and Adair there is a necrosis of the tissue and a disintegration of the fat which is followed in a few weeks by the appearance of giant cells and later by an obliterating endarteritis by the formation of cysts of fibrous tissue and of a lined fibrous wall.

On examination there is found an irregular stony hard mass the firmness is due to the fibrous tissue. The mass is attached in many cases to the skin. In some of the cases there is a retraction of the nipple. In differentiating the condition from carcinoma great reliance is placed on the appearance of the mass soon after trauma and also on the absence of axillary gland involvement.

Gross sections show the encapsulated fat or cysts. There are none of the chalky points or the streaks of fatty epithelium as seen in carcinoma on naked eye inspection. Microscopically there are seen cellular overgrowth, fibroblasts, lymphocytes, empty spaces once filled with fat, areas of proliferating fat cells and phagocytic giant cells (Ewing). No giant cells were seen in the section from the case here reported.

Treatment: excision of the mass—amputation of the breast is not necessary.

### CASE III. TUMOR OF THIGH

Anthony V. George, thirty years of age, a black male, occupation, farmer.  
Admitted 5/23/29. Discharged 6/24/29.  
Family History—Negative.

H d g t  
 Ey Pupl q l gul e ct o m lly N t ocul p l  
 Muth gat  
 N k N b m l p l t N d p thy  
 Ch t A gl f L p t E p g d d q l l s  
 at H rt h d p y t l m m l t l hock  
 Ald m N m ft d  
 E t m t L ft l —l th m d d l th d f th t f e f  
 th th gh th m m g 12 10 l t d g 6 m bo l



Fk 455—N co f l ft t l gh se m th p d g th m th  
 Cyt p ll ll

f ex f tl th k l (I g 455) Tl gl l l tl f on  
 l m all l tt hed th sof p l t h k  
 Th t l t l th re l t d l  
 k n p se t l l  
 Lat t y F t  
 Bl l red blood cell 3.4 0.000 h l l cell 12.000 h m gl l  
 60 f re t l f t l llood t l l l 4 f ce l  
 4 f ce m l cell 3 pe ce l m p sex 19 pe ce

Labo ry Exam t U d pe fi gra ty 10 2 f int t ce  
 f fb m gat ef g leukocy yth ocyt d cast  
 Ray Exam t D B m 5/23/29 \ 56 50  
 Ch t Sh ma ked d ty h hl m haggerat f tru L  
 h d d tly d t h f t

Diagnosis—It is very probable that this patient had a sarcoma. It is also probable that this tumor was not associated with the bone because the tumor was over the middle of the shaft of the femur whereas sarcoma of bones usually occurs at the diaphyse. Nor was it a Ewing's tumor—endothelioma of bone—because there is not a concentric enlargement of the extremity. The interesting point in this case is the presence of a quiet cent mass in the thigh for eight years following a severe accident with a sudden and progressive growth of the mass following a comparatively trivial injury to this area. What is the explanation? Probably that as a result of the first accident the patient had an organized hematoma or even a giant cell tumor of the fascia which from repeated irritation or as a result of the fall changed its character to a sarcoma. Patient refused an amputation.

#### CASE IV SPINDLE CELL SARCOMA OF MUSCLES OF THIGH

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 11/23/25 Dsch g d 12/12/

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 w ll

P t H t —\ ga e

P er M d t H t —D l h ry Oth h  
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H t y f P t Ill —Ch f mpla t m fl ft th gh

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 iz f l f m h p d g dms h t mo h d be gr

g p dly Th m e p fl d l feely m bl Th  
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 m ss ) d tld h t h m f ty m

Th pat t h gh h m m gh be d som bru se h t  
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 k oof

Ph af E m t —A f l ll hed mal \ dy p ea  
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T fifty fi m t

P g

11/26/26 G ze d m d

11/30/26 Some se oo g f m t f d

12/7/26 All t m l W u d l a

12/11/26 U bl t t ly fl th gh l bl t b kb

th l ft l r t m ty

Dsch g d 12/15/26

H t l g port (D C Y Wh t) Sp ll ll sa (l g 4 6)

E d es lt R cu t l ppe l f ca 4/ 2 2 (f

45) U l l t h ld k t l l g t g ty D l Sept l 122



Fk 45 —Recu t sa m W lk ll l g-o e l k p t l d  
b t th l l k l l g t g

# CASE V RHABDOMYOMA OF THE MUSCLES OF THE LEG

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M h h l sc g  
l ex M d l H l —l g f  
H lory f P t ll —A h l l l l g h m  
bo Dece be 10 h gl t f t l l l l g l h l l t sc m l  
com l f l O t l g f ll h l h l l f l g  
va ll F th k f ll g h l h h l l l k ed l l

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 g ma k d ce t t f th l ma l gs f th l g f i d Th fl  
 tration d ll t th p e Th doub dly d sem ed  
 p o c e d t th m ta t t t m h f ct  
 Ope t —D \ hh 11/24 26 \ h r E h E f  
 t mo f h gh E ma h ba i ppl I W th p h pad  
 f m f r r r



F g 45b —H gh po f i d h s m y g p d i cell

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 ssel d ru l r v o s e i bo d m d t rum Th  
 tum f d l h ex cl i h m sel The  
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 ssel and t d t h d j Th p f h ed o  
 geth d h d h i l f h f m l cl sed b

te pt d lk m g t lod f m g d t ppe gl f th  
 on Tm fifty fi m t  
 P g  
 11/26/26 G d m d  
 11/30/26 Som se g f m t f d  
 12/7/26 All t m l W d l  
 12/11/26 U bl t t ly fl th gh l bl t b gh  
 1 ft l t m ty  
 Dsch g d 12/15/ 6  
 H t l g po t (D C Y Wh t) Sp dl ll com (F 4 6)  
 E d lt R t d ppe d f sca 4 2 (F g  
 57) U H t h ld k t d d g t g ty D 1 S pt ml 1)

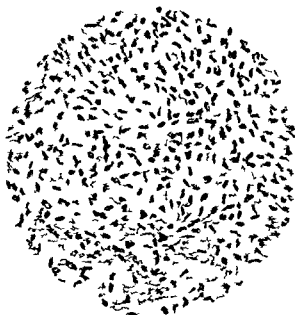


g 45 —P cu t a W lk ll g l k pt lt d  
 l te th l k t l l g t g t

# CASE V RHABDOMYOMA OF THE MUSCLES OF THE LEG

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 sch ged 7/2/26  
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 tot h d y m c g  
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 H t y f P t III —h h l l l d g h  
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 n gat e p th l l ll m y l cell ryth ocyt d east  
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 g ma ked ce tu t f th l ma k gs f th l g f l d Th fil  
 t t t d ll t th p Th d b dl d sem ed  
 p oee d t h m t t t c t m ch f ct  
 Op t —D A h h t 11/24/26 A h E h E f  
 t m f th gh E na h b l p r l l Wy th p th pad  
 f m l r r



F g 45 —H gh po h ld h s m g p dl cell

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 tum f d l h l d h m sel Tt  
 tum sed m se h l l l g ss see t y t m  
 Bleed g po l ga d f m l f q Th p m l mp of  
 th sart d h l s d th f m l  
 essel d t ed h ld Th ps f h tu ed o  
 ge h d h f h d l t m f f h f m k l sel by

rupt d lkw m g t l l f m g d t pp r gl f th  
Tm fifty fi m t

P g

11/26/26 G d mo d

11/30/26 S m se oo g f m t i d

12/7/26 All t d W l l

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l ftl t mty

Dwh g d 12/15/26

H t l g j t (D C Y Wh t) Sp dl ll n (F g 456)

E l lt R t d pp l f 4/29/ 7 (F g

7) L bl t h ld k t d l g t g ty D d Sept mbe 19



F g 457—R t W lk w ll l g-o l g p t t l t l  
l t ca t l l l k t l l g t g ty

# CASE V RHABDOMYOMA OF THE MUSCLES OF THE LEG

E l y C f ul l d g t d h ll l m t t d 2/ 3/ 6  
D x l g 17/2/26

F ly H t y—I th n th d th l d l g d ll

At t h l y sca g

P m M d al H t y—F g f y

H t r y f l t l l —A th h ll t d g h

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m l f p O tl g f ll g th l t th l f l g wa

m ll F th k f ll g th l t th h ll l k d bo t



b t t th d f th t t m h beg t lk h oes F mon h pr  
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 compl t f pa ce th l y f th l t ht S ll g h  
 ex sed bo ce th th set  
 E l —W lk toe foo ru d k ee fl d V bl  
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 th k ee fl ed C cumf f ght calf 16 m f l f ll m

I



L

F g 458—Ph m g ph f m se t m ed t pera f  
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 l ged lymph d l f gr Th m lightly th bo  
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 bo l m

U g t e  
 Bl d R d blood cell + 100 000 h t blood ll 10 400 h gl b  
 101 pob l O pe ce m l 9 p t t l 5 pe  
 ce t lymph yt 54 pe ph l l pe  
 Ope t 3/4/26—S g D A hh t A h th E

ft m E ma h b d bo k l f m bel popl t l pa  
 to sert ft d hll G t oc m w f d p l t ppe  
 half ft m d t h d T m w f d t l sol m l T m  
 mo d po g pot t b l self m l t d f d D p  
 f se losed by t pt d h m N l Sk l sel by lock t h l m  
 00 Pla pa f m toe t m dth gh

H at l g R p t—R l ll m (F g 458)



F g 459—H gh pe fi ld f se t f t f F ly C C se V  
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 Al se t f m sel ll l All th ll gh  
 l l l l

F g —W l t d l j t l t ll J ly l W k C l  
 fl l ce k t t d m l sel g l lly t  
 Ray m t fl g 4/8/26 (N 12450) pe l h l l h l m  
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 in greatest mea urement l admittet

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 F m l —W lk toe foo ru d k ee fl ed v bl  
 p dl h ped ll g flect g m l f ce l th l f m k ee lm st  
 t t l mall l D fl u f k l m t d t 115 d gree th  
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F g 458 — Ph m k ph f m se m red t pe t f  
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 101 poly l 30 pe ce m l 9 pe t t l 5 pe  
 ce t lymphocytes 54 pe ce eo ph l 1 pe  
 Ope t 3/4/26 — S g D A hh A h h E

H i l g Rep t—T s m l t th t m l 3/4/26  
 P g —Th w d h l d by p mary t t T k ft  
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 S b g t H i y—A f w m th ft th l t d sch g th  
 curr t t m t d th c l f f th l g F th th l g  
 p t t d t th t p t l th ty

**Discussion**—On reviewing the slide from the second operation I found numerous non striated muscle fibers which were strongly acidophil some giant cells some mitotic figure no cross striation seen (Figs 459 and 460) In the field were numerous acidophil round cell which were cross sections of muscle cell and numerous dark staining cells as seen in Fig 458 (from the first operation) the latter are probably myoblasts The histologic picture it seems to me is that of a rhabdomyoma

#### PRIMARY MALIGNANT SKELETAL MUSCLE TUMORS

The malignant muscle tumors are of two varieties viz (1) sarcoma and (2) rhabdomyoma

The sarcoma springs from the endomysium or the perimysium Histologically these tumors are either a fibrosarcoma or a myxosarcoma with large or small cell It is possible that undifferentiated sarcoma of muscle could occur from myoblast or multipotential bone forming elements This variety is supposed to occur at the tendinous insertions

Rhabdomyoma of skeletal muscle is one of the rarest tumors reported Wollbach in the Archive of Pathology and Laboratory Medicine of June 1928 make note that up until that time there were not more than 28 cases which were authentic and of these there was some doubt about 5 of the cases really belonging to this group Rhabdomyomas are more common in the kidney and testis also though much less frequently they have been reported as occurring in the heart esophagus tongue parotid gland and breast Histologically the tumor is made up of parallel bundles or intertwining strands of striated muscle fibers The cells assume a spindle shape with prominent nuclei and are usually acidophil The nuclei in most of the cells are situated

History on 5-1-18m on—Kerlin on on Sept. 22-19  
discharged D. comble 17-11-19

The patient had symptoms of disability the previous day  
at 8 Readmitted in 1919 noted in 9/14/20

Laboratory—L. 21

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2 per cent lymphocytes 2) per cent Amputated d wd lu fused

Operation—Sept. 23-19 Surgeon D. Ashburton Anesthetic  
eth. Ex. m. l. eruent t. m. l. ma h. l. l. n. knee l. ci m



Fig. 40—C. S. V. F. ly C. l. th. sec. t. seen me su  
lo gated pupil cell high g m w. cell M. y f h cell h d  
m. figu

f. m. o. cal. t. t. l. and y. l. f. m. f. e. c. t. g. k. j. f. A. e. c. r. e. n.  
wh. f. l. e. s. u. t. m. a. w. f. l. b. e. l. o. w. m. l. l. f. c. a. l. f. d. g. e. m. a. f. g. s.  
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e. r. s. d. i. r. e. c. t. e. d. f. e. r. f. m. h. m. a. s. s. l. t. n. a. s. d. l. l. f. h. m. u. s. c. l. e. s. f.  
t. h. i. n. t. e. r. o. r. s. e. t. f. h. f. g. e. r. w. d. l. f. k. 5k  
l. o. w. l. w. h. h. o. m. l. o. s. t. e. r. a. p. l.

*H t l g R p t—T m l t that m d 3/4/26*  
*P g —Th w d h l d by j mary t t Tw eek ft*  
*ope t Coley fl d w tart d th serum w gr e ry*  
*fou day g d lly ng dose u t l t th t m f d sch g th pa*  
*t t c g 5 m D sch g d 12/17/26 w th t gn f ecu ce*  
*S b q t H t y—A f w m th ft th l t d scha g th*  
*cu t t m w t d th calf f th l g F th ce h l g*  
*mpu t l t th hosp t l th ty*

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ated in the center the characteristic position in the young muscle cell. Many mitotic figures are seen. Cross striations are absent in most of the cell probably because the characteristic striation appears in the late stages of the muscle cell development.

# CASE VI. MULTIPLE TUMORS OF THE NECK, FACE, AND TRUNK

William J. M. age thirty years married black male. Admitted 1/10/25. Discharged 2/10/26.

Family History—Mother died of milk ligament disease. Ovaries removed. Obituary dated 1918. Mother died of heart failure. Mother died of heart failure. Mother died of heart failure.



Fig 461—Neurocytoma



Fig 461—Same patient

Physical Examination—Measles, mumps, chickenpox, diphtheria, whooping cough, hemorrhoids, laryngitis, tonsillitis, tracheitis, bronchitis, pneumonia, tuberculosis, syphilis, gonorrhea, venereal disease, etc.

*Il t y f P t Ill* —Ch f mpl nt m l l l pa f l l l g  
 About m th bef lm t d m l l l m l l h f  
 m h h d l t d d h h h th ght bo l h  
 d l t t k d d d sappe d bo t l Th f l l d  
 h rly ft ly th l mp t l sa f m h h d d t d pr



Fig 463—C se VI S m t l t m h

l h h f l l d l y ma y l l p f l l l l  
 th p t f w k l mp l be g g p dly  
 Ex m t —A m look g m l h se f tru k l pr  
 t t co d ly d l (l g 4(1-4(1) g  
 f m ggt g Tl od l f l l h t k s s l l  
 l cy f l t t l l y gt l t l

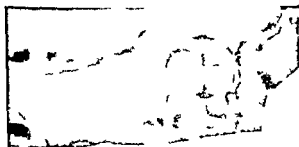


Fig 464—V f d y bef l h

M h T l l co l  
 Ch t H nt l l k l l t l m l c f od k  
 P t  
 1/1/25 l l l exp l l l l l l l r g  
 l l r k g l l l f l l  
 1 24 25 p t p l l l l l



1/28/25 I t l

2/9/25 H t m l p m

2/10/25 De th

Lab t y E m t —U<sub>ri</sub> 101 eg t f lb m g

l leuk t

Blood Wht blood cell 00 polyn l 80 pc m l rs

2 pc ce t t l 1 pc t lymphocyt 16 pc t

Discussion —At fir t it was thou ht that thi was a ca e of malignant degeneration of von Recklinghaus disease. The hologic action from the specimen removed at biop y was reported as a round cell sarcoma (Fi 46 and 466). Multiple



Fig 46 —H t log cal se f b p pc m f W M C se VI  
Sh m d k g d cell

round cell sarcoma: p rct c lly unk o v n c n s quently the e multiple tumor mu t be m t tatic gro th

At the autop y there e found th following l ions viz  
(1) Primary tumor behi d the left kidney. The m v as soft in co sistency pal gray color mea u el / 4 x 1 cm a d was den ely adherent to the kid ey capsule b t d d not in ol the

kidney substance (2) Metastatic nodules in stomach pancreas left lung all the lymph glands the right tibia and in numerous subcutaneous areas Histologic examination of the primary growth showed normal adrenal cortex to which there was attached a tumor mass made up of numerous round cells with a tendency to rosette formation (Fig 461) and some chromaffin cell Histologic diagnosis was neurocytoma

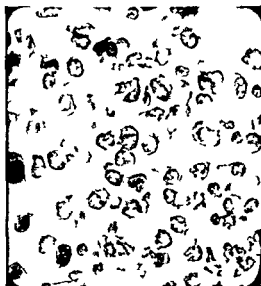


Fig 461—W. M. C. Sec. VI. Hgl. x 100. (H. H. I.) 14465

Malignant adrenal tumors are of two varieties (1) Adenocarcinoma arising from the cortex and (2) neurocytoma from the medulla. The tumor have no relation to hypernephroma. Hybernephroma is a tumor of the kidney supposed to arise from adrenal rest.

Neurocytoma which is also known as ganglioma malignant sympathetic fibroma and sympathetic sarcoma is most frequently seen in children under the age of 10. In children it is seen in two clinical types. In the vast majority the latter type there is metastasis to the liver with marked enlargement of this organ.

1/28/25 I t t

2/9/25 H t m l p m

2/10/25 Death

Lab t y E m t —U 101 g t f lb m ga  
ll kocyBlood Wh blood ll 200 pol l 80 pe m lears  
2 pe ce t t t l l pe t lymphocyt 16 pe en

Discussion — At first it was thought that this was a case of malignant degeneration of von Recklinghausen's disease. The histologic action from the specimen removed at biopsy was reported as a round cell sarcoma (Figs 465 and 466). Multiple



Fig 46 — Histologic findings from biopsy specimen of Wilms' tumor  
Sh m l k g d ll

round cell sarcoma is practically unknown consequently these multiple tumor must be metastatic growths.

At the autopsy there were found the following lesions: (1) Primary tumor behind the left kidney. The mass was soft in consistency, pale gray color, measured  $4 \times 1$  cm and was densely adherent to the kidney capsule but did not involve the

The case is not only unusual in the character of the tumor (neurocytoma) but also is of particular interest in that it occurred in an adult. In adults the e tumor are said to be associated with peculiar sexual powers and unusual strength—symptom not noted in our patient.

## CASE VII PAROTID TUMOR

John S. H. T. y. f. g. d. m. l. y. oc. f. VI. 1  
321/29 Dec. 14/11/29

F. I. H. I. —I. th. l. l. fl. h. p. m. M. h. l. l.  
ll. F. l. th. d. f. t. l. g. l. ll. O. f. l.  
6. m. t.

P. l. H. t. y. —H. l. ca. l. t. f. l. ph. th. h. m. l. t.  
y. g. h. l. m. p. t. t. f. l. ft. l. g. l. l. w. k. th. l. f.  
k. N. l. f. t.

H. l. f. P. t. III. —I. ft. y. g. t. l. ll. k. l.  
k. ft. j. At. t. m. th. m. g. t. m. l. m. ll. f. l. l.  
f. ce. p. th. b. t. th. m. p. t. t. j. ll.  
ce. se. l. g. 4(8. h. tl.



f. g. 4(8. —I. ll. l. f. fl. y. ll. k. p. d. y. ll. l. l. l.  
l. l. t. ll. f. f.

Th. l. t. l. h. l. ft. g. l. h. h. h. l. l. l. ce. f.  
bl. ce. y.

F. m. t. —y. g. l. h. m. l. ll. l. l.  
H. l. se. lp. se. l. g. t.  
Mouth. sl. l. l. ca. T. l. l. se. l. O. l. l. f. j. h.  
l. ge. ll. g. h. n. f. k. 4(8. Th. ll. g. cl. h.  
l. f. h. j. h. l. l. l. t. l. f. se.  
Neck. N. l. p. h. Th. l. ll. l. h. ll.

In the second type the Hutchinson the growth occurs in the left adrenal with metastasis to the orbit causing exophthalmos (frequently the first symptom) and metastasis to the ribs vertebral and long bones.

Malignant tumor involving the left adrenal have a more wide spread metastasis than those of the right. From the left adrenal the lymphatics leave the lower pole of the gland with the



Fig. 46. — Section of lymph node from adrenal medulla.

vein and join the renal lymphatics thus gain to the adrenal lymphatics connect with the pelvic lymphatics the mesenteric nodes and the deep cervical nodes. The lymphatics of the right side pass to the thoracic duct and from this point are limited in their passage to the thoracic duct and lungs. The wide-spread metastasis in the case here reported was due to the involvement of the left adrenal.

metastasi (5) Malignant change in mixed tumors must be rare and its occurrence difficult to prove (6) Interval of ten twenty or thirty years may elapse between operation and recurrence

In contradistinction to McFarland's views are those of Fry published in the British Journal of Surgery of October 1921. The latter believe that (1) the so called mixed tumor of the

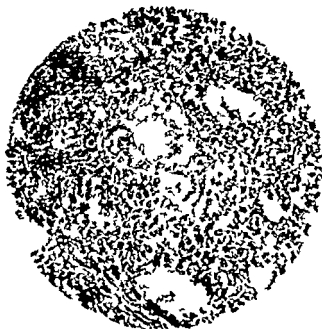


Fig 409—Cross section of a mixed tumor of the salivary gland showing the epithelial and connective tissue components.

salivary gland are not mixed but epithelial in origin. (2) mixed in not exactly from the duct but actually from the secreting gland. (3) the neoplastic material in these tumors is due to a retention of mucoepithelial cells and an overproduction of a normal function of the gland. (4) the ducts are not normal. (5) the matrix is formed by hyaline connective tissue. (6) the tumor is not a true mixed tumor.







appearance and its power of staining deeply with mucicarmum and the cells are epithelial cells.

On one point Fry and McFarland agree—that is about the prognosis. On this point Fry states: "Some of the tumors show various degrees of malignancy; there is no definite dividing line between the innocent and the malignant and some of the



Fig. 40—1. Detail of Fig. 39. Malignant tumor of the parotid gland.

malignant may have features typical of the innocent type of tumor. It would seem that the pathologists have worked some of the urenschreibella about malignant tumor of the parotid.

The histologic section of this case showed a round epithelial cell (Fig. 469) some of which were in flat pavement-like arrangement. Also there was a substance which had

power looked like cartilage but which under high power was seen to be made up of a fibrillar material enclosing vacuoles



Fig. 41. Low magnification view of mucinous material enclosing cells.

Fig. 40. Figure 41 shows mucinous material which was found in large amount. No cartilage or bone was seen.



## CONTRIBUTION OF DR. J. H. SLIP DAVIS, D. V. C. S.

### MIDDLE NASAL TURBINAL ABNORMALITY FUNDAMENTALLY RESPONSIBLE FOR MANY COMMON ILLS REGARDED USUALLY AS OF DOUBTFUL OR UNKNOWN ORIGIN

It is my purpose to undertake herein a further discussion of the responsibility of certain definite intranasal abnormalities as the prime cause of sinusitis, cases widely prevalent, difficult of treatment, and generally regarded as but rarely amenable to cure.

While these diseases have long been known to be associated with or complicated by more or less intranasal disturbance, yet so indefinite have been the observations as to any exact site or character of the nasal phase of the problem that but few have ventured to assign to them the importance of etiologically fundamental factor.

Two conditions to which usually the greater attention has been directed in attempt to evaluate the nasal factor are septal irregularities, reflecting purrles, etc., and active infection of the paranasal sinuses, acute and chronic.

Turbinal abnormalities seem usually to be appraised upon a basis of the degree to which respiration is impeded, and since the inferior turbinate occupies a position more directly within the normal respiratory channel, and also is the one most subject to surgicent variation, it naturally has attracted greatest attention. It likewise, for the same reason, has received undue consideration in the matter of treatment, typically and surgically.

It is felt that all inferior turbinal variance from the normal is probably not caused by some regional primary lesion, therefore, very few inferior turbinals require local treatment other than palliative, inasmuch as it obstructing interference will interfere on the elimination of the controlling influence. During



surrounding the primary site better to destroy too little than too much in a field of so intricate and highly sensitized structures endeavoring to eradicate all new growth and all tissue which may have degenerated beyond hope of restoration and to preserve not only all healthy membrane but likewise all partially affected tissues that through subsequent treatment might be reclaimed. Such a course of conservatism may occasionally necessitate a second or even third operation but better so with ultimate success than to frustrate further hope by too radical procedure when in doubt.

In July 1923 I read before the Colorado Congress of Ophthalmology and Otolaryngology an article entitled "Latent Evils in Congenitally Deformed Middle Turbinals Later Manifested When Supplemented by a Focus of Chronic Infection" which was published in the Therapeutic Gazette (February 15 1924). In that article I submitted the proposition that in the existence of a certain type of abnormal middle turbinal rests a latent noxious influence which when supplemented by the intermediate influence of a focus of chronic infection (most frequently located in the faucial tonsil) may become a potent etiological and perpetuating influence upon a group of common diseases.

I shall omit in this article any detailed discussion of the influence of chronic tonsillar disease toward creating and perpetuating a favorable field for infection and degenerative changes within the nasal chambers and paranasal cavities in order that more space may be devoted to further discussion of the intranasal lesion and the malresults resulting therefrom. The existence of laceration is however in any case must be dealt with promptly in order that the most favorable resistance both local and general may be enlisted in nature's struggle toward elimination and repair.

In my previous article it was stated "The grounds upon which my deduction are based are largely clinical and while the evidence herein cited cannot be regarded as conclusive yet when a certain pathology not merely of function but also of definite anatomical lesion is observed to coexist in a high degree of uniformity with certain related disorder and that the mani-

twenty seven years practice I have not resected either the whole or part of an inferior turbinal in more than a half dozen instance

Regarding the middle turbinal however conditions are entirely different for I am fully convinced that it is the most common abnormality within the nasal channel and at the same time the most potent causal factor in a wide range of disease processes. I am further convinced that the deformations are hereditary in origin in numerous instances harmful to health through the mere abnormality but much more so when altered by pathologic changes both in their own and adjacent structures and through which there is established an intricate and pernicious influence sufficient to produce an important group of common malady generally regarded as etiologically obscure. There of course may be and usually are other factors local and constitutional oftentimes many that play important roles. In fact it is usually those associated and complicating factors which determine the character of the eventual disease entity and of its symptomatology through the various stages of development and progress nor is it out of place to add in this connection that the complicating factors constitute the chief difficulty in effecting a complete cure in some cases even though the original and fundamental cause be effectively eradicated.

The failure to obtain a cure in any given case by operation upon intrinsic nasal abnormality or morbid condition does not necessarily disprove the etiologic theory but may attest rather to the incompleteness of the operation in eradicating either the original lesion or the resulting pathologic changes. Neither does it follow that the more extensive the operation the more perfect will be the result. Thoroughness in any surgical procedure and especially within the nasal chamber is a matter of precision rather than of scope. It is important that the original malformation be completely removed but when the adjacent or neighboring tissues which have under one pathologic change are dealt with it becomes a matter for careful consideration as to the degree of eradication required. Each case in that respect becomes a law unto itself though one general rule holds good at all times with reference to the handling of pathologic changes.

surrounding the primary site better to destroy too little than too much in a field of so intricate and highly sensitized structures endeavoring to eradicate all new growth and all tissue which may have degenerated beyond hope of restoration and to preserve not only all healthy membrane but likewise all partially affected tissues that through subsequent treatment might be reclaimed. Such a course of conservatism may occasionally necessitate a second or even third operation but better so with ultimate success than to frustrate further hope by too radical procedure when in doubt.

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of these abnormalities to the effect that the deflection of the septum is the result of pressure exerted by an overdeveloped turbinal nor conversely that the deflected septum by pressure against the turbinal on the side of its convexity produces an atrophy or underdevelopment of that structure while the enlarged turbinal that fills the space in the concave side of the deflection represents a compensatory hypertrophy. I am fully convinced that the enlarged and malformed turbinal as herein described instead of possessing any increased function is in reality deficient in every phase of function with which the normal structure is endowed.

The normal middle turbinal then being an appendage springing from the superior border of the medial ethmoidal mass should occupy a dependent position hanging freely between the nasal septum medially and the ethmoidal wall laterally but not in contact with either wall except perhaps when in a more or less markedly turgid or inflamed state. Furthermore the body of the normal turbinal thus suspended is not fixed in a rigid position but may be moved somewhat to either side with but slight pressure exerted with a probe or other examining instrument.

**Arbitrary Division of Aberrations Found — Type I**—Those that show variations from the normal in conformation (i.e. always increased in skeletal structure with more or less hypertrophy of enveloping membrane) and position the latter being of greatest importance. They may or may not contain aberrant ethmoid cells. This class usually is not complicated by extensive pathologic changes particularly degeneration with polyp formation in the turbinal body itself or the adjoining ethmoid structure. *Its position is not disturbed by impingement against the lateral nasal wall. It is free to move slightly sensitively in the ethmoidal structure and the middle fossa. It sets up the reflexes necessary to produce the results mentioned.* The scope of this article will not permit of a discussion of the physiological processes involved when the trigeminal and sympathetic nerve fibers through pressure stimulation obstruct within the middle fossa are incited to various degrees of participation.

Though complex it seemingly has been very rationally explained by various authors

*Type 2*—This type has all of the usual physical characteristics of the first and in addition either through more or less chronic low grade inflammation or merely from pressure has undergone extensive pathologic change both in the turbinal body itself and in the adjacent ethmoid structure. Polypoid tissue is always found in the middle fossa (of this class) and probably also in some of the ethmoid cells principally anterior though they may not have been visible on examination prior to ablation of the turbinal. It is more frequently unilateral but may be bilateral and there usually exists considerable increase in size. When the degenerative changes are bilateral that of the larger turbinal (on the concave side of the deflected septum) is apt to be the source of greatest trouble.

Twining in his text book on Neoplastic Diseases states: "Nevertheless it is quite clear that in the nares more than in any other mucous membrane the polypoid outgrowths of chronic inflammation lack the histological features of an autonomous new growth. In fact as Chiari claimed in 1887 many of them consist of nothing more than localized edematous areas of mucous membrane rendered protuberant by mechanical means but without other changes. Once established however these masses are subject to various grades of hyperplasia of their elements which render them not only persistent but often progressive and in such cases there may be considerable change in the appearance and proportion of various cells. Since this change is seldom pronounced the groups of nasal polyp must stand among the purest examples of pseudoneoplasm of inflammatory origin."

Nasal polyps are probably always preceded by chronic rhinitis and Tisserand traces an unbroken series of cases from simple chronic rhinitis through hyperplastic rhinitis to polypoid inflammatory outgrowths. The tumor appears chiefly in young subjects and infants rarely after thirty years generally at the orifice of the mucous sinus opening into the nares. Empyema of the ethmoid is a common antecedent.

*Type 3*—The class of middle turbinal is radically different from 1 and 2 in that while there is abnormality in conformation and size and also in subsequent pathologic change its relation to the middle fossa is not the essential factor. The turbinal body seems to have developed posterior to the usual location or rather as though about as much as the anterior third were very much underdeveloped the remaining portion is overdeveloped but manifests distinct degenerative change and is rigidly impinged against the posterior portion of the *septal wall* instead of the lateral wall. In some cases the central and posterior part of the middle fossa seem also occluded but the septal pressure is constant. This condition may be unilateral or bilateral and in some cases the hypertrophy seems sufficient to cause pressure also against the sphenoidal wall.

#### SOME COMMON MALADIES OCCURRING IN CLASS I MALFORMATIONS

Headache Neuritis Neuritis Neurasthenia Anemia Hysteria Ocular Affections Dysmenorrhea Tinnitus Aurium Varying Degrees of Dizziness and Vertigo and Chronic Olfactory Disturbances

Explanation for the variableness of effect produced from a common cause in different individual just why this or that symptom should predominate in any given case or why as I have observed in a few instances the supposed essential etiologic intranasal pathology may be present yet without any manifestation of disease either subject or objective must be based upon the fact that the local lesion alone is in all respects the same in any two cases. Furthermore not only the diversity of local factors but also variation in the individual element and external influence play a complicated role.

Headache being by far the most common and also the most important of the numerous troubles in this class I shall discuss this malady first and mention the others in detail.

The term headache with its meaning is very limited in its bearing. Even when all manifestations of intranasal lesions acute infection of the paranasal sinuses syphilitic arterio-

scloerotic pituitary disease etc. are excluded the remaining varieties of discomfort so designated are wide in range variable in degree and altogether complex in a diversity of associated phases

Migraine being unquestionably the one most definite type of headache with its characteristic syndrome and also because of its importance with respect to both its common occurrence and the intensity of distress induced is chosen for more or less detailed consideration

I wish to state at the outset that of the several hundred patients that I have operated upon for headache a large number of them have presented a symptom complex conforming to that of typical migraine and that the results have been uniformly satisfactory in nearly all. It was this type of malady that first attracted my attention to the constancy with which I could demonstrate in every case without exception the abnormality of middle turbinal which I eventually designated as etiologically essential

From this I became further interested in the hereditary phase of a group of diseases that presented in their syndrome certain common characteristics and the fact that in all of that group the same distinguishing features attended the intranasal lesions. I began then to make examinations of all members of any family in which one or more suffered more or less similar complaints and whenever opportunity was presented it was found that turbinal abnormalities were repeated from generation to generation seemingly in about the same degree of regularity as would conform to the recognized law of heredity

Church and Petersen in their text book "Nervous and Mental Disease" define migraine as follows

Migraine is an explosive paroxysmal psychoneurosis. The attack usually commencing with sensory and mental symptoms is almost always attended by headache which is frequently one sided and there is generally nausea and vomiting. It is sometimes called hemicrania, sick headache or megrim. Owing to the vomiting it is often erroneously attributed to biliousness

Under the title they state Heredity is strongly marked

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#### SOME COMMON MALADIES OCCURRING IN CLASS 1 MALFORMATIONS

Headache Neuralgia Neuritis Neurasthenia Anemia Hysteria Ocular Affection Dysmenorrhea Tinnitus Aurium Varying Degrees of Dizziness and Vertigo and Chronic Disturbance

Explanation for the variability of effect produced from a common cause in different individuals just why this or that symptom should predominate in any given case or why, as I have observed in a few instances, the supposed essential etiological intranasal pathology may be present without any manifestations of disease either subjective or objective must be based upon the fact that the local lesions are none in all respects the same in any two cases. Furthermore not only the diversity of local fact but also variation in the individual element and external influence play a complicated role.

Headache being by far the most common and also the most important of the group I mention in this class I shall discuss them in detail first and mention the others in detail.

The term headache without more qualification is a bewildering. Even when all manifestations of intracranial lesions acute infection of the paranasal sinuses pharynx

sclerosis pituitary disease etc are excluded the remaining varieties of discomfort so designated are wide in range variable in degree and altogether complex in a diversity of associated phases

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the first of these states Hereditary is strongly marked

It is more commonly direct than in almost any other neurosis. Migraine may sometimes be traced through several generations numbering dozens of cases in a single family tree. Any neuropathic family is almost sure to present cases of migraine. It seems capable of transmission by transformation alternating with hysteria, epilepsy, and insanity. It may be associated with the graver neuroses or with psychoses in a given patient. Gout and arthritis have similar close relations with it. Thirty per cent. of cases begin between five and ten years of age and the balance appear mainly at puberty, adolescence and during early adult years. It is rare in infancy; it may begin after thirty. The female sex is somewhat more commonly affected than the male.

The inciting cause is often obscure. Some cases date from periods of lowered physical health arising from any cause. The cases beginning in early childhood very frequently follow the first systematic use of the eye for near vision, as in school work. Eye strain arising from accommodative or muscular asthenopia is certainly competent to incite migrainous attacks in those predisposed. Gouty or lithemic condition, constipation, indigestion, fatigue, lactation, emotional disturbance or any febrile movement may set up the attack.

Partly because of the vagueness of their description and because certain features brought out that are of interest in relation to my own theory pertaining to essential cause. I wish to quote at further length from the same author:

*Symptoms*—The headache is the most uniform dominant and distressing symptom. It arises in different cases in degree, duration and location, but is commonly intense and ordinarily circumscribed at least at first. Often commencing as a localized intense pain in a small spot in the temporal, frontal, ocular or occipital region it gradually spreads to the head. Less commonly it commences on both sides, frontal or occipital pain. Rarely it passes down the back of the neck and into the arm. The character of the headache is tolerably uniform in the same case, but some patients have alternating high and low reappearances from time to time and are recognized by old acquaintances. The

character of the attack may also undergo great modifications during the patient's lifetime. The headache lasts from one or two hours to ten, twenty or forty, and may subside abruptly after nausea and vomiting or gradually grow less and disappear. During the height of the headache the patients usually shun light and noise and remain as quietly recumbent as possible. Movement such as rising or stooping intensifies the pain. Tenderness of the scalp or nerve trunks is unusual.

In most cases nausea appears after the headache develops or has reached its height and there is complete anorexia. Digestion appears to be stopped as unchanged food is sometimes vomited many hours after its ingestion.

*Pathology*.—In the absence of knowledge regarding the morbid anatomy of migraine we are thrown back upon theories and analogies. Attracted by the vasomotor symptoms many attributed the migrainous attacks to disturbance of the sympathetic. This is a clear confusion of effect and cause of symptom and disease. Taking into consideration the cortical features manifest in sensory disturbance, hemiopia, tingling, aphasia, motor loss, crossed hemiparesis, mental features, cardiac and digestive inhibition and the vasomotor disturbance itself there can be little doubt that migraine is a cerebral disorder. Its resemblance to epilepsy if not its actual relationship point to the same conclusion. The exact nature of the cortical instability is for the future to reveal.

Regarding epilepsy I wish to say that I have had unusual opportunity for personal study of this disease over a period of three years during which time I have operated upon 210 cases. A detailed report of that study will be made at another time in a separate article. Suffice it say at the present time however that the turbinal pathology in that malady conforms to the formative characteristics which I have remarked degree than in the case of this case studied.

The most frequent unilateral type of headache variable in intensity that I have encountered is first felt about the eyes and is thereafter frequently accentuated at the supra-orbital notch and along the distribution of the supra-orbital



nerve. It may remain confined to that region for a short time in mild cases and disappear. When it persists which it more frequently does for a few hours or even the whole day rarely longer it becomes more and more severe radiating over the temple to the parietal or postauricular region eventually to settle and become most intense in the occiput and back of the neck. The pain is very similar to that of a real migraine attack but without the complete migraine syndrome. Neither sex seems to predominate and it makes its first appearance around puberty though I have seen cases at a much earlier age. It may then occur at irregular intervals most frequently and with greatest intensity through the third and fourth decades. The turbinal pathology in these cases is typical and complete relief is obtained by operation in nearly 100 per cent of cases.

There is a common type of bilateral headache described by B. Landis Elliott of Kansas City in a symposium article on Headache from the Neurological Aspect. He says: We find sometimes that the patient suffers not so much from actual headache or pain as from a sensation of discomfort or distress. This may be described as a feeling of pressure a feeling of emptiness or fullness or sometimes a band about the head. When a patient tells us that he has suffered constantly with headache for years and we find upon close inquiry that the headache has some of the features just described we must at once think of neurasthenia. Especially if he has been able to sleep in spite of his discomfort. This is probably the most frequent form of headache with the exception of migraine and is closely related to the fatigue or exhaustion headaches occurring in individuals who otherwise enjoy good health. That is the type of headache in which I have most frequently found bilateral enlargement of the middle turbinal and rigidly impacted against the lateral wall. Complete relief in a high percentage of cases is obtained by resection of the middle turbinal.

Elliott also describes this typical hysterical headache the so-called claw hysterical or hysterical nail. The patient often describes it as the setting of a nail being driven into the

skull at the vertex. The pain is usually localized to an area not larger than a half dollar. It may last for hours, days or weeks. Sometimes an obstinate posterior headache which may radiate to the temples and forehead is noted in hysterical patients. Hysterical headache may occur in combination with headache from other causes in the same patient. In all these cases one must search carefully for hysterical stigmata: absence of the corneal reflex, pharyngeal anesthesia, hemianesthesia, etc. The fantastic character of the complaints and the character anomalies of hysteria which are sometimes present may aid in establishing the diagnosis in a doubtful case.

Bowers defines hysteria as follows: A psychoneurosis which occurs usually in individuals who possess highly neurotic and unstable constitutions. The disease is manifested by emotional episodes, increased susceptibility to external impressions, period of depression and marked sensory, psychic and motor disturbances. Regarding etiology, he considers heredity the most important factor, a family history of insanity, epilepsy, chorea or alcoholism being found in about 80 per cent of cases. Males suffer to same degree as females, its first appearance is usually in early adolescence though it may occur earlier and later, and is often associated with organic psychoses.

Typical hysteria, as well as less pronounced neurotic manifestation, I have no doubt are another phase of disease resulting from the same hereditary pernicious nasal lesion inasmuch as hysterical traits are so commonly observed cropping up in the symptom complex of practically the whole group of diseases associated more or less with hereditary influence. Neurotic tendencies have been common in many of my own cases and regarded a part of the disease though I have never had a case of typical classical hysteria.

In the same symposium on Headache in which Dr Elliott's paper was presented was another of interest by Dr Lawrence of St. Louis on Headache of Ocular Origin. He analyzed 110 cases from his own practice from which I shall quote

Middle Nasal Turbinal Abnormality. W. B. S. J. Compagny, Philadelphia.

several point applicable to the study of intranasal lesion as affecting eye disorders. He states: "I expected to find that most of the eye headaches would prove to be of ocular origin but only about 65 per cent impressed me after careful study as being due to refraction or muscular troubles. An analysis of the other 35 per cent indicated that the larger number of cases was undoubtedly due to nasal disease: some were apparently digestive, some from high blood pressure, an occasional one from low; some were typical migraine and parenthetically I might remark that I excluded migraine from the group due to ocular trouble as I believe this disease to have other basis and then of course with out enumeration others there was the group of those for which no etiology was ever determined. An analysis of the nature and location of the headaches revealed that of those who mentioned specific location and it is important to note that the majority did not complain of any particular location by far the most frequent was frontal being two thirds of the total and of these about one half were unilateral. Next in frequency came the occipital and next those at the top of the head."

The type of errors of refraction chiefly associated with headache were as expected hypermetropia and hypermetropic astigmatism. The next most frequent cause was imbalance of the extra-ocular muscles but this occurred scarcely one fifth as often. Relief obtained by refraction he states:

"The best results were obtained in the group of those who complained of general headache without any particular location having been recorded in the history. Sixty-four per cent of these were rendered comfortable. The bilateral frontal group was next with 60 per cent relieved. Pain in the vertex was seldom helped and occipital pain in only 27 per cent while no case of unilateral headache was entirely alleviated by the ocular treatment. The unilateral cases I believe were almost all due to sinus infection and many of them were helped by nasal treatment."

It is interesting to note that the unilateral cases and those with occipital headaches with which Post had least success

the ones which I have found most frequently associated with turbinal abnormality and which usually give the most satisfactory response to operation. Regarding vertex headaches however I have never found any evidence that would associate them etiologically with any intranasal pathology. That various types of refraction errors as well as the associated headaches may be brought about by middle turbinal pressure lesions is very probable. My attention was first attracted to this class of conditions by inquiries of an occasional patient (who used eye glasses) some weeks or month after turbinectomy for headache as to whether the operation could have injured his eyes stating that since the operation his glasses did not seem to be right. On having him consult his oculist it would be found that the previously recorded errors were greater than that found in the recent test whereupon to use the common lay expression weaker glasses corrected the trouble.

That the middle turbinal lesion often is the essential cause of chronic or recurring ulceration of the cornea I am quite positive. I have had several cases that had persisted in spite of treatment by skilled oculists over period varying from a few months to two years that cleared up promptly following middle turbinectomy. The cases were all unilateral and all adult males.

There is a bilateral type of abnormal middle turbinal markedly enlarged in skeletal structure and enveloped with excessively hypertrophied mucosa. I have found not uncommon in association with periheliotic attacks of urticaria distinguishing in character. In two of the cases the excesses swelling and irritation invaded the mucous membranes as well as the face and body and both were cured by complete double turbinectomy.

Urticaria Stelygon and Galkinate. Urticaria may occur at all ages and in both sexes and in all countries. It is much more frequent however between the age of early childhood and middle adult age and is possibly somewhat more common in the female sex. There are many causes but there is

Describes the following published by W. B. Saunders Company  
Philadelphia

some peculiar individual predisposition necessary inasmuch as the same cause may not produce the eruption in different subjects. In some instances a hereditary influence or predisposition is observed especially in the cases associated with giant lesions and edematous swellings.

Many cases of facial neuralgia (including two of obstinate tic douloureux) dizziness vertigo and tinnitus have also yielded to the same treatment.

I not infrequently have seen patients who had been living in a state of more or less constant fear and apprehension of impending death because of an existing or periodically recurring attack of vertigo which they had imagined or their physician had misinterpreted as some serious form of heart affection. The complete relief commonly resulting from correction of the turbinal lesion therefore has led me to believe that far more cases of vertigo originate within the nasal fossæ than from all other causes combined. I have seen complete and lasting cessation of obstinate tinnitus aurium to ensue as a result of middle turbinatectomy frequently more often than I have ever been able to obtain from any form of treatment directed toward the aural mechanism itself.

**Type 2**—Maladies commonly resulting from this class of complicated turbinal lesion include those usually spoken of as nasal neuroses and not only those of mild degree such as paroxysmal sneezing and turbid olfaction and the anaesthesia etc. but also the two major maladies asthma and hay fever. It is the latter two that I shall consider at greater length in this discussion.

The terms bronchial asthma true bronchial asthma cardiac asthma renal asthma asthma of possible nasal origin etc. suggest the diversity of opinion upon the etiology of a malady which regardless of its causation in unduly significant factors of its wide diversities in complication influence and of its innumerable external excitants all possess the same symptomatic complex differing only in point of intensity.

While practically all writers give prominent consideration to the nasal aspect of asthma and maintain a nasal causal

factor in some cases I know of none who has called attention to a definite anatomic lesion whether altered by malformation malposition or chronic pathologic change commonly found in any class of cases even those designated as nasal asthma and to which was assigned the rôle of essential cause

Most authors who admit a nasal causal factor in some cases of asthma usually attribute the reflexes produced to more or less indefinite abnormalities affecting the septum or to any existing sinus infection with the associated engorgement of the nasal membrane or else a mucous polyp. All such source of irritation are important as complicating factors and must not be ignored. On examination they are more obvious than the majority of diseased middle turbinals which usually are so closely impinged against the lateral wall as to disguise their own noxious condition and relation to the neurosis in question. The altered tissue of the diseased middle turbinal itself is rarely visible from either anterior or posterior inspection and especially is the complicated condition in the middle fossa and ethmoid cells completely hidden by the enlarged overhanging turbinal. That the degeneration process with more or less polypoid formation is always present in so serious a case of asthma may be inferred from the fact that in every case of asthma I have been able to detect it in all cases depending upon most of which are not demonstrable before operation. The polyps are more frequently small and multiple though occasionally there may protrude one or more large ones.

I Watson William Bristol England in 1910 treated the subject of neuralgias in a most interesting and thorough manner but stopped just short of recognizing what I believe to be the primary and essential lesion in a thoma and hay fever. I wish to make a real quotation from his observation though not from consecutive paragraph. "An axonal neering may be due (1) to reflex peripheral irritation in the ear and middle ear of true hay fever in which the symptom appear with the patient exposed to pollen etc and in case due to some local abnormality in the nose (2) to a central neurosis eg. tetes. Under the preceding causes. The exciting causes

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some peculiar individual predi position necessary inasmuch as the same cause may not produce the eruption in different subjects. In some instances a hereditary influence or predi position is observed especially in the case associated with giant lesions and edematous swellings.

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The terms *bronchial asthma* *true bronchial asthma* *cardiac asthma* *renal asthma* *asthma of possible nasal origin* etc. suggest the diversity of opinion upon the etiology of a malady which revolves about its causation in underlying factors of its wide distribution its complicating influences and of its innumerable external excitant till present the same symptom complex differs only in point of intensity.

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Underlined pointing cause The existing cause





overhanging turbinal body. The fact that the existence of polypi is often unobserved prior to operation explains his remark.

Often we shall discover nothing beyond hypertrophic rhinitis, edematous mucous membrane or vascular engorgement of the turbinal bodies. Also another statement in the nature of a conclusion. The very large percentage of patients with large nasal polypi who do not suffer from asthma and the very large percentage of true asthmatics in whom no polypi can be found tend to prove fairly conclusively that there is no direct connection between nasal polypus and asthma as cause and effect.

Practically all that has been said regarding asthma may be applied also to hay fever. I believe that in these maladies there exist the same fundamental etiologic factors differing it may be in degree of turbinal abnormality, intensity of pressure against the lateral wall, expanse of nasal area, extent of invasion of tissue, change in the ethmoidal mass, etc. I know that from the same surgical procedure and similar subsequent care the results have been uniformly satisfactory in a high percentage of cases.

**Type 3**—Under this type of turbinal abnormality there is but one disease which I wish to report as commonly occurring therewith and that is the distressing form of atrophic rhinitis commonly called by the name of its prominent clinical symptom, *ozena*. Since my attention was first attracted by this relation about fifteen years ago I have not seen a single case of *ozena* that did not manifest the peculiar turbinal lesion, nor has the complete resection of the lesion failed to cure the malady. I had never until this peculiar association between the malady and this limited type of turbinal mentioned by any writer till recently while reviewing the subject (having consulted over its text book on rhinology) I found this paragraph in Watson and Williams' *Rhinology*. There is considerable diversity of opinion as to the pathology of atrophic rhinitis and it must be confessed that the actual pathology of this common affection is at present an open question. Then follow several different views advanced among them being. The view held by Berliner that it is associated with nasal obstruction and due to

pressure of the middle turbinal against the *septum* with consequent defective secretion. Watson Williams says further

The disease may be unilateral and is often more pronounced on one side than the other. Though heredity appears to have some influence—ozena is essentially a disease of puberty and young adult life and the majority of cases are found in females.

Probably the disease is a clinical rather than a pathologic entity and the symptoms may occasionally be due to a communicable infection thus differing from the great majority of cases. The disease has been attributed to the action of many different micro-organisms.

Space will not permit of any further discussion of individual diseases so I shall confine myself in the remaining time to remarks applicable to the entire group.

#### GENERAL REMARKS

It is worthy of note that all of the affections herein attributed to the influence of middle turbinal variations from the normal plus certain subsequent pathologic alteration have long been observed to manifest a more or less characteristic hereditary phase. From my investigations upon the subject over a period of twenty years I am convinced that the ethmoid bone in its genetic development is prone to irregular deviations from the normal in a considerable proportion of the human race. These aberrations may be observed from early childhood to maturity in the form of distortions of the nasal septum and middle turbinal structure the latter being the more important from the standpoint of pathologic lesions. They are rarely the result of accident but originate in conformity to recognized laws of heredity eventually to become the primary and essential factor in the genesis of many morbid processes. These morbid processes though varying widely perhaps in the characteristic feature of their manifestation nevertheless present in their general symptom complex certain more or less analogous phases.

Conditions contributing to the pathologic alteration of the middle turbinal and adjacent ethmoidal structures seem to be a continuous low grade or silent infection with with

out visible purulent suppuration. In some cases it may be merely pressure hypertrophy. Other intranasal abnormalities such as septal deflections, ridges, spurs or synechæ and even active purulent sinusitis unless it involve the anterior ethmoid cells in association with abnormal middle turbinals with or without prominent polypoid production I believe to be complicating factors but never of fundamental importance. Any such associated irritants however in the course of treatment must be eradicated in order that the nose and sinuses may be restored to as nearly the normal state as possible. A predisposing constitutional condition upon which many have laid stress is a necessary factor to be sure but the predisposition is probably a matter of several combined factors just as the local cause is a complex process depending upon certain pathologic changes allied to an exciting potential primary lesion. The incidence of heredity applies to a constitutional predisposition the same as to turbinal abnormality to be increased or diminished later by various and sundry influences. Even the predisposition itself may be a result of the abnormality instead of an independently contributing influence. An external irritant or exciting factor is likewise necessary to the attack but upon that phase there are few if any corroborant views. Anaphylaxis, protein sensitization, hyper-irritability or by whatever name it may be designated is something more than a state arrived at through the ultimate pathologic complex which began with the turbinal abnormality and without which primary lesion could not have developed.

It must be remembered that the anterior portion of the middle turbinal may appear practically normal in some of those most affected throughout the remaining part of the structure and that the actual complex lesion is limited by the lessening of the innervation again to the lateral wall. The middle turbinate or the anterior part of the posterior half of every abnormal and inflamed middle turbinal is always the most fitting region for the intratubular. Hence it always has been my intention if possible to preserve any part of the middle turbinal as a permanent structure and to perform a complete and clean extirpation.

Anticipating the criticism that the complete removal of the middle turbinal may be productive of atrophy or that it exposes the ethmoid sinuses to increased susceptibility to infection I wish to say that there could be no greater error in judgment. In the first place the incidence of infection even in the normal sinuses depends not so much upon the exclusion of supposed foreign bacteria as upon the integrity of inherent agencies of resistance. One might as well argue that the occlusion of a nasal passage would protect its lining mucosa from infection for the *normal middle turbinal* by its conformation and position favors rather than obstructs sinus ventilation. The abnormal turbinal then influences sinus infection in proportion to the degree to which its hyperplasia and malformation restrict normal sinus ventilation and its removal restores in some measure at least that factor of function.

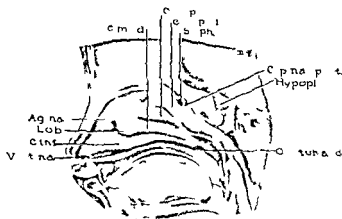
If then it can be demonstrated that the primary factor is a definite anatomic malformation to which must be added other definite pathologic changes before an individual definitely predisposed constitutionally can be affected by a particular external irritant then the matter of relief or cure is established upon a rational basis. I believe that it can be done.

In closing I wish to say that it is not without a full realization of the distinguished opposition that my position upon the whole subject will invite. Nevertheless I am willing at this time definitely to affirm that the primary and essential cause of the maladies herein discussed is contained in the specified lesion of the middle turbinal and ethmoid structure. In other words whatever pathological condition I state whatever pathological process within the nasal chambers wherever and whatever external irritant may be necessary for the occurrence of such paroxysmal explosion the mechanical impulsion must emanate primarily from lesions within the middle nasal fossa and it adheres to be the complex reflex neurovascular what ever it may be necessary to incite the syndrome which characterizes each particular malady could not otherwise occur.

## ADDENDA

To illustrate the progress of development of intranasal and paranasal structures at various stages from four and a half months fetal life to early adult maturity I have selected and appended herewith illustrations of eight specimens of the Warren B Davi collection at the Daniel Baugh Institute of Anatomy Philadelphia which have been already published by the W B Saunders Company

I have added under each original legend a word regarding the point of interest in relation to my own article



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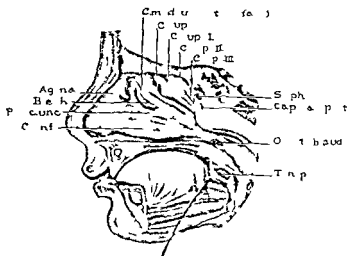
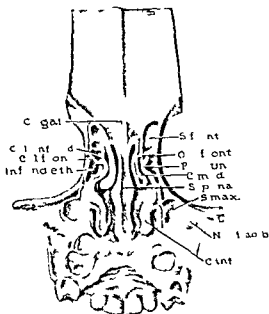


Fig 473—S g t l c m d l p o t h I m m t h  
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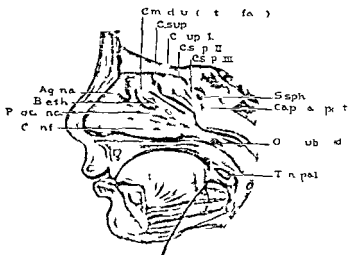
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F 44—Sj c f m l d t th d s e d y  
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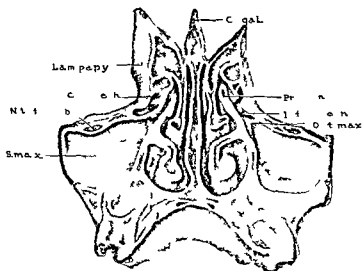


Fig 476—Spe m f m hld y t m th d t  
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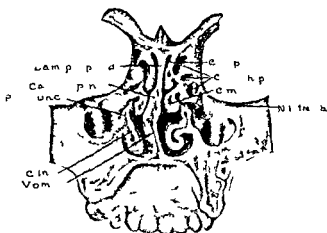
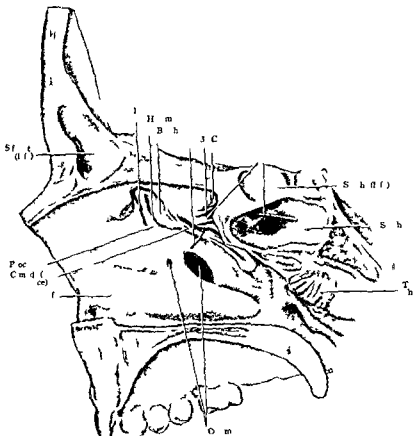


Fig 475—Spec m f m h l f h y f m h d ght  
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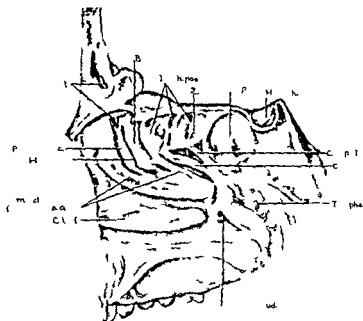


Fig 4 — pe m f rtee y d sc h ld (Se D  
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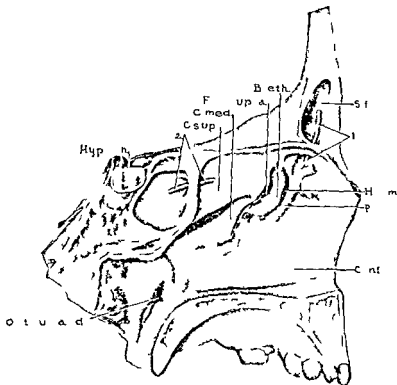


Fig 49—Specimen 15 mm t th l ft f m d  
 d 11 (be es D \ 91) Sagittal sec 15 mm t th l ft f m d  
 l A t po f co h m dia h bee rem d t h h l  
 t f rut f m g h l t l sal ll f P be th gh t m  
 f l 2 p be h gh m ph d l Sf t l t l H m  
 hiat se l P process t C f co h l  
 O t t b d t ph ry g m be d t æ Hyp ph hypophy C p  
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